

**The Distribution and Reproductive Success of the Western Snowy
Plover Along the Oregon Coast - 2004**

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This report is dedicated to the memory of three male plovers, BL:B, BL:W and BR:YG. BL:B was banded as an adult male in 1991 at New River. He was the oldest and most productive plover on the Oregon coast. He was last seen on 1 May 2004. At 14 years of age, he was one of the oldest plovers on record. BL:W was one of the first chicks ever banded in 1991. He hatched at New River, and spent the next 12 breeding seasons at Coos Bay North Spit. He wintered on San Nicolas Island, Ventura County, CA. He was found dead at Guadalupe Dunes on 15 Oct 2004. BR:YG was banded as an adult male in 1995 at Tenmile. He spent the nine breeding seasons at Tenmile where he raised numerous chicks and became one of the most productive males on the Oregon coast. He did not return after the winter of 2003-2004. Their presence on the beach in the future will be sorely missed.

DJL and KAC

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Abstract

From 2 April – 10 September 2004, we monitored the distribution, abundance and productivity of the federally Threatened Western Snowy Plover (*Charadrius alexandrinus nivosus*) along the Oregon coast. From north to south, we surveyed and monitored plover activity at Sutton Beach, North Siuslaw, Siltcoos River estuary to the Dunes Overlook and south to Tahkenitch Creek, Tenmile Creek, Coos Bay North Spit, Bandon Beach, and south from the mouth of New River to Floras Lake. Our objectives for the Oregon coastal population in 2004 were to: 1) estimate the size of the adult Snowy Plover population, 2) locate plover nests, 3) continue and expand the use of mini-exlosures (MEs) to protect nests from predators, 4) determine nest success, 5) determine fledgling success, 6) monitor brood movements, 7) collect general observational data about predators, and 8) evaluate the success of predator management.

We observed an estimated 136-142 adult Snowy Plovers; a minimum of 120 individuals was known to have nested. After six years of plover populations ranging from 95-113, there was an increase of approximately 35 adult plovers along the Oregon coast in 2004. Overall Mayfield nest success was 56% (n=117), the highest since 1994. Exclosed nests (n=81) had an 86% success rate, the highest since monitoring began in 1990. Mini-exlosures were used exclusively in 2004. Unexclosed nests (n=36) had a 20% success rate. Nest failures were attributed to unknown depredation (40%), abandoned (20%), unknown cause (13%), corvid depredation (11%), infertility (7%), mammalian depredation (7%), and wind/weather (2%). We monitored 73 broods, including two from unknown nests, and documented a minimum of 107 fledglings, the highest number of broods and fledglings since monitoring began in 1990. Overall brood success was 88%, and fledgling success was 55%, the highest since monitoring began in 1990. Fledgling success rates at sites with predator management in 2004 were significantly higher than at these same sites with no predator management in 2003, and brood success was much higher at these sites in 2004 than 2003. Overall brood success, fledgling success, and fledglings per male were very high for all sites suggesting that predator management positively influenced survival of chicks and overall productivity.

Continued predator management, habitat improvement and maintenance, and management of recreational activities at all sites are recommended to achieve recovery goals.

TABLE OF CONTENTS

ABSTRACT	i
INTRODUCTION	1
STUDY AREA	1
METHODS	1
RESULTS	5
Abundance and Distribution.....	5
Nest Activity.....	6
Nest Success	8
Nest Exclosures	9
Nest Failure.....	10
Fledging Success	11
Captive Reared Plovers.....	13
Brood Movements	13
Activity Patterns on HRAs	14
2002 Hatch-Year Returns	14
Sightings of Snowy Plovers Banded Elsewhere.....	14
DISCUSSION.....	15
Habitat Restoration and Development Projects.....	17
RECOMMENDATIONS.....	18
Signing of Restricted Areas	18
General Recommendations	18
ACKNOWLEDGMENTS	19
LITERATURE CITED.....	20
TABLES 1-13.....	23
FIGURES 1-11	36
APPENDIX A. Study Area.....	47
APPENDIX B. Site Specific Recommendations	48

Introduction

The Western Snowy Plover (*Charadrius alexandrinus nivosus*) breeds along the coast of the Pacific Ocean in California, Oregon, and Washington and at alkaline lakes in the interior of the western United States (Page et al. 1991). Loss of habitat, predation pressures, and disturbance have caused the decline of the coastal population of Snowy Plovers and led to the listing of the Pacific Coast Population of Western Snowy Plovers as Threatened on March 5, 1993 (Federal Register 1993).

We have completed our 15th year of monitoring the distribution, abundance, and productivity of Snowy Plovers found along the Oregon coast during the breeding season. In cooperation with federal and state agencies, plover management has focused on habitat restoration and maintenance at breeding sites, predator management through both direct predator control and by placing predator deterrent exclosures around nests as a means of reducing egg depredation, and management of human related disturbances to nesting plovers. The goal of management is increased annual productivity that will lead to increases in the overall breeding population in Oregon and eventually lead to sustainable productivity and stable populations at recovery levels. Previous work and results have been summarized in annual reports (Stern et al. 1990 and 1991, Craig et al. 1992, Casler et al. 1993, Hallett et al. 1994, 1995, Estelle et al. 1997, Castelein et al. 1997, 1998, 2000a, 2000b, 2001, and 2002, and Lauten et al. 2003). Our objectives for the Oregon coastal population in 2004 were to: 1) estimate the size of the adult Snowy Plover population, 2) locate plover nests, 3) continue and expand the use of mini-exclosures (MEs) to protect nests from predators, 4) determine nest success, 5) determine fledgling success, 6) monitor brood movements, 7) collect general observational data about predators, and 8) evaluate the success of predator management. The results of these efforts are presented in this report.

Study Area

We surveyed Snowy Plover breeding habitat along the Oregon coast, including ocean beaches, sandy spits, ocean-overwashed areas within sand dunes dominated by European beachgrass (*Ammophila arenaria*), open estuarine areas with sand flats, dredge spoil sites, and several habitat restoration/management sites. From north to south, we surveyed and monitored plover activity at Sutton Beach, North Siuslaw, Siltcoos River estuary to the Dunes Overlook and south to Tahkenitch Creek, Tenmile Creek, Coos Bay North Spit (CBNS), Bandon Beach, and south from the mouth of New River to Floras Lake (Fig. 1). A description of each site occurs in Appendix A.

Methods

In March 2004, pre-breeding season surveys of historical nesting areas were completed and in June 2004 breeding season window surveys were completed. State and federal agency personnel and volunteers surveyed sites between the Columbia River south to Pistol River. The surveys were implemented to locate any prospecting plovers at

locations not known as currently active nesting sites. The following additional areas were either surveyed in early spring or the breeding window survey: Fort Stevens, Necanicum Spit, Bayocean Spit, Netarts Spit, Sand Lake Spit, Nestucca River Spit, Siletz Spit, and Pistol River Spit.

Breeding season fieldwork was completed from 2 April to 10 September 2004. Survey techniques, data collection methodology, and information regarding locating and documenting nests can be found in Castelein et al 2000a, 2000b, 2001, 2002, and Lauten et al. 2003. No modifications to survey techniques were implemented in 2004.

Based on the success of mini-exlosures (MEs) and the predator management program in 2003 (Lauten et al. 2003), we elected in 2004 to expand the use of MEs to all nests at all nesting sites. No standard size exclosures were used in 2004. Predator management was also expanded to all active nesting areas, specifically for corvids, based on the success of previous seasons and increased funding. For specific information regarding the predator management program, see Little and Williams 2004. We also continued to delay the placement of exclosures around nests until approximately mid-May, when peak raptor migration had passed (Castelein et al 2001, 2002, Lauten et al. 2003). Lauten et al. 2003 describes the materials, design, and erection procedures of MEs. There were no new modifications to the MEs. We compared the Mayfield nest success of mini-exlosures and unexclosed nests by Chi-square analysis.

Male Snowy Plovers typically rear their broods until fledging. In order to track the broods we banded the nesting adult male, sometimes the female, and each hatch-year bird with both a USFWS aluminum band and a combination of colored plastic bands. In 2004, we implemented a new trapping technique based on methods used in California (G. Page, S. McAllister, pers. comm.). We used standard designed noose carpets, which are six inch by 32 inch pieces of hardware cloth covered with fishing line nooses. The standard trapping technique with noose carpets is use of three carpets, all placed around a nest in a triangular manner. A plover returning to incubate the nest crosses one of the carpets and gets snared by the legs in the nooses. We modified this technique by using only one carpet, and surrounded the nest with a second piece of hardware cloth with no attached nooses. This piece of hardware cloth was pushed into the sand on edge in a half moon or half circle shape, which prevented the returning adult plover from accessing the nest bowl from three directions. The single noose carpet was then laid flat across the opening of the half circle piece of carpet, and anchored into the sand with spikes. The returning adult plover would have to cross the noose carpet to return to the nest bowl, and thus become snared by the legs. An advantage of this method is reducing the number of noose carpets carried in the field. Noose carpets are delicate and there is a need to be careful maintaining them, so having fewer in the field both reduces the amount of equipment field staff carries and reduces the amount of time spent maintaining carpets. We monitored broods and recorded brood activity or adults exhibiting broody behavior at each site. Chicks were considered fledged when they were observed 28 days after hatching.

We estimated the number of Snowy Plovers on the Oregon coast during the summer of 2004 by determining the number of uniquely color-banded adult Snowy Plovers observed during the breeding season, and added our estimate of the number of unbanded Snowy Plovers that were also present. We determined the number of unbanded plovers by the same methods described in Castelein et al. 2001, 2002 and Lauten et al. 2003.

We calculated nest success using apparent nest success and the Mayfield method of nest success (Mayfield 1961, Mayfield 1975). We calculated overall apparent nest success, which is the number of successful nests divided by the total number of nests, for all nests and for each individual site, and overall Mayfield nest success for all nests. We also calculated an adjusted Mayfield nest success for both exclosed and unexclosed nests. The adjusted nest success calculations for exclosed nests eliminated infertile nests because they did not fail due to an extrinsic cause (i.e., depredation or an environmental factor) and adults incubated the eggs longer than the typical incubation period, which would bias, in particular, the Mayfield calculations. One egg nests and nests found already depredated were eliminated from unexclosed nest success calculations. For the Mayfield calculations, these failed nests have a survival rate of zero because the nests have no known active dates, and therefore the calculation is divided by zero unexclosed days. Adding nests with no survival rates would bias the calculations to lower estimates of survival.

We calculated brood success, the number of broods that successfully fledged at least one chick; fledgling success, the number of chicks that fledged divided by the number of eggs that hatched; and fledglings per male for each site. We compared brood and fledgling success of sites without predator management in 2003 (Siltcoos, Overlook, and Tahkenitch) with the results for these same sites with predator management in 2004 using Chi-square analysis.

We evaluated the activity patterns of plovers on four habitat restoration/management areas (HRAs): the Overlook, the HRAs at CBNS, Bandon Beach HRA, and the New River HRA. We defined four main usage types: roosting, foraging, nesting, and brooding. Our intent was to show in a simple manner the response of plovers to restored habitats, and therefore, the potential benefits to plovers afforded by habitat management projects.

Results

Abundance and Distribution

Pre-breeding March surveys and the June window survey at sites between the Columbia River and Pistol River did not detect any plovers or plover activity outside of known nesting areas.

During the 2004 breeding season, we observed an estimated 136-142 adult Snowy Plovers at breeding sites along the Oregon coast (Table 1). Of 136-142 plovers, 128 were

banded. We estimated there was a minimum of eight and a maximum of 14 unbanded adult plovers based on the numbers of unbanded plovers accounted for during the 10-day intervals. The alternative evaluation of estimating unbanded plovers also determined a minimum of eight unbanded plovers was present during the breeding season. For the breeding season, using the latter method of determining a minimum number of unbanded plovers (eight), we observed 64 banded females, 64 banded males, four unbanded females, and four unbanded males.

The mean number of plovers recorded at each site in 2004 ranged from zero at North Siuslaw and Floras Lake to 11.58 at New River (Table 2). Sutton Beach continues to decline in plover numbers: 3.65 in 2002, 1.54 in 2003, and 0.13 in 2004. At Siltcoos, plover numbers on the south spit also declined for the third consecutive year: 5.37 in 2002, 3.26 in 2003, and 1.95 in 2004. This was offset by increases on the north spit: 1.24 in 2002, 2.39 in 2003, and 5.45 in 2004. At Overlook, plover numbers on the north side remained relatively stable, 5.42 in 2003 compared to 4.95 in 2004, while the south side increased from 0.52 in 2003 to 2.67 in 2004. At Tahkenitch, all habitat on the south side was eroded away during the winter, so there were no surveys conducted in 2004. On the north side plover numbers declined from 6.47 in 2003 to 4.74 in 2004. At Tenmile, plover numbers on the north side increased from 2.52 in 2003 to 3.46 in 2004, but the south side declined from 7.41 in 2003 to 4.83 in 2004. There was an increase in the number of plovers at CBNS, which is apparent in the mean number recorded on South Beach surveys: 5.97 in 2003 compared to 10.82 in 2004. This increase was not reflected at South Spoil and 94HRA where the mean number of plovers remained relatively stable between 2003 and 2004: for South Spoil, 3.21 in 2003 compared to 2.77 in 2004, and for 94HRA, 6.78 in 2003 compared to 7.65 in 2004. Bandon Beach had a large increase in the mean number of plovers: 2.73 in 2003 compared to 7.65 in 2004. New River remained relatively stable: 12.69 in 2003 compared to 11.58 in 2004. No plovers were detected at Floras Lake for the second year in a row.

Nest Activity

We located 117 nests during the 2004-nesting season (Table 3), the highest number of nests found since monitoring began in 1990. There were two additional broods from nests that we did not locate prior to hatching.

There were no known nesting attempts at Sutton Beach, the first time since nesting was documented in 1993.

At Siltcoos, seven nests were found on the north side, the first documented nesting since 2000. Four nests were found on the south side, continuing a declining trend on the south side of the estuary. The total of 11 nests at Siltcoos reversed a declining trend in nesting attempts at this site. All nests were within the restricted area of both spits.

At the Dunes Overlook there was an overall increase in nesting attempts: 14 in 2004 compared to nine in 2003. Eleven of the nests were found on the northern section

and three nests were found on the southern portion, both increases from the previous season. One nest on the north side and one nest on the south side were west of the ropes; ropes were moved around the nests. All other nests were on the habitat management areas.

At Tahkenitch, continued erosion of the south spit left no habitat on that side of the estuary, resulting in no nest attempts for the first time since 1993. All nest attempts occurred on the north spit, but the overall number of nests found declined from 13 in 2003 to eight in 2004. All nests were within the roped area except one that was south of the roped area; ropes were moved south to encircle the nest.

Tenmile continues the recent trend of increasing nest attempts, with 17 total nests found for both spits in 2004 compared to 16 in 2003 and 12 in 2002. For the third consecutive year, the north side had the most nests ever found: nine in 2004 compared to five on 2003 and three in 2002. Eight nests were found on the south side, a decrease from 11 in 2003. On the north side, one nest was found east of the ropes, one nest was found south of the roped area, and one nest was along the foredune just north of the spit. Ropes were moved or erected around these nest sites. All other nests were within the roped area. All nests on the south side were within the roped habitat management area.

At CBNS, 26 nests were found in the 2004-nesting season and there were two broods from undiscovered nests. South Beach had two nests, both on the BLM section of beach. South Spoil had a similar number of nests in 2004 as in 2003: eight nests compared to nine. On the 94HRA, 15 nests were found, an increase from eight nests in 2003. Only one nest was located on the 95HRA. The 98EHRA was overgrown with grass and vegetation and had little use this season. The locations of the nests of the broods from undiscovered nests were unclear, but both broods were discovered on the 94HRA and it is likely they originated from the 94HRA or South Spoil.

During the fall of 2003, an additional 30 acres of habitat was restored at Bandon Beach, increasing the available nesting area to a total of 50 acres. Plovers responded to the improved habitat, and 17 nests were found all within the roped management area. For Bandon Beach, this is the highest number of nests ever found, only the third time 10 or more nests have been found, and the first time since 1993 that 10 or more nests have been found.

At New River, 24 nests were found this year, an improvement over the last two seasons (16 in 2003 and 14 in 2002). Early in the season we marked, using GPS, the southern boundary of Bandon Beach State Natural Area using coordinates given to us by OPRD staff. The boundary indicated that a large portion of the open spit south of the mouth of New River is state owned land. Seven nests were located north of the boundary line on the open spit. South of the state land is Coos County owned land; five nests were found on county land. Two nests were found in overwashes on private lands, where the habitat continues to degrade as European beachgrass stabilizes the dunes and sand and vegetation fills in the overwash areas. Four nests were found on the open beach on the high dry sand along the foredune. All four of these nests were south of the mouth of

Fourmile Creek; three were most likely adjacent to private land, and one was adjacent to either BLM or private land. Six nests were found on or adjacent to the BLM habitat restoration area west of Storm Ranch. Four nests were on the northern section of the HRA, one nest was on the beach just west of the northern portion of the HRA, and one other nest was on a beach shelf adjacent to the HRA, much further south of the other nests but north of the breach. No ropes were used at any location at New River, however we did erect carsonite signs on a majority of the state land on the open spit and around nests when they were found on county and private land. Carsonite signs were erected by BLM on the east side of the HRA at Storm Ranch, and some carsonite signs were erected along the west end of the northern section of the HRA.

Habitat at Floras Lake remains relatively good on Curry County land and adjacent private land, but there was no plover use detected in these areas.

Due to a very dry March and early April, nest initiation in the 2004-nesting season was early. In 2003, there were no active nests during the first 10-day interval in April, while in 2004 there were 15 nests initiated in the same time period, over 10 nests more than average (Figure 10). The first nest was initiated 5 April compared to 16 April in 2003. The number of active nests then dropped to about average by the end of April due to nest failures. Nest initiation then increased in early May and the number of active nests remained extremely high through the middle of July. The maximum number of active nests during 10-day intervals was 44 during 31 May - 9 June and 10 June - 19 June time periods. This is the highest number of active nests recorded during any time interval since monitoring began in 1990. The last nest initiation occurred on 17 July.

Approximately 86% of the adults (120/136-142) were known to have made a nesting attempt during the 2004-breeding season, slightly higher than the mean for 1993-2003 (79%). Of the nesting adults in 2003, 58 were female (55 banded, 3 unbanded), and 62 were male (59 banded, 3 unbanded).

Nest Success

The overall Mayfield nest success in 2004 was 56%, the highest since 1994 (Table 4). Adjusted Mayfield nest success for all enclosed nests in 2004 was 86%, the highest nest success rate since monitoring began in 1990. All enclosed nests in 2004 were enclosed with MEs; Mayfield nest success for MEs in 2003 was identical to the Mayfield nest success in 2004 (86%, Lauten et al. 2003), although the ME sample size in 2003 was small. Unenclosed nests had an adjusted Mayfield nest success rate of 20%. Adjusted Mayfield nest success of unenclosed nests was significantly lower than the adjusted Mayfield nest success of enclosed nests ($\chi^2 = 62.138$, $df = 1$, $P < 0.01$).

The overall annual apparent nest success rate of 62% in 2004 was higher than the 15-year mean of 51% (Table 5 and Figure 11) and higher than 2003 (51%). Overall apparent nests success for enclosed nests was 85% and 8% for unenclosed nests. For 2004, individual sites overall apparent nest success was near average or above average (compare Table 5 to Figure 11), except for North Overlook and South Beach. At North

Overlook, the low overall apparent nest success rate (27%) was due to six unexclosed nests that failed early in the season to unknown depredation. At South Beach, there were only two nests, one unexclosed that failed to corvid depredation and one that was exclosed but was infertile. North Siltcoos, South Siltcoos, and Bandon Beach all had apparent nest success rates much higher than the overall mean for these sites.

Nest Exclosures

In the 2004 breeding season, of the 117 nests, 81 were exclosed with mini-exclosures (69%). No nests with MEs were depredated, however, a feral cat (*Felis catus*) depredated one adult male plover incubating an exclosed nest on the 95HRA at CBNS. The cat walked along a vegetated berm along the foredune road and came upon the exclosed nest, which was adjacent to the berm. The male plover apparently was captured as it attempted to exit the exclosure. We removed the exclosure to prevent the potential for the female of the nest to be depredated if the cat returned to the area. The cat did return, depredated the eggs, but did not depredate the female. The cat was then subsequently captured and removed by Wildlife Services.

No other adult plovers were known to have been depredated inside or near any exclosures during the 2004-breeding season. Three banded adult plovers did disappear during the nesting season and may have been depredated. One female was associated with an unexclosed nest at South Tenmile early in the nesting season. The nest failed to unknown depredation, and the female was never seen again. She was a regular nesting bird at South Tenmile. One male at New River disappeared after 6 May. At the time he was believed to have been the male of an exclosed nest, but there was no evidence in or around the exclosure that he had been depredated near the nest. The nest was subsequently abandoned. Another male at New River, BL:B, disappeared after 1 May. At the time he was not associated with any nest nor was he apparently paired with any female. Both of the males were regular New River breeding plovers, therefore there is little reason to suspect they moved elsewhere. A fourth male disappeared at New River after 30 June, however, this male was a newly banded adult with no history, so it is unclear if he dispersed or migrated from the area. He was believed to have been associated with an exclosed nest at the time, but there was no evidence in or around the exclosure that indicated he had been depredated. The nest was subsequently abandoned.

While the MEs proved to be successful at preventing depredation of eggs, and adult mortalities around MEs were minimal, we did record Common Raven (*Corvus corax*) activity around several MEs that most likely resulted in depredation of newly hatched chicks. At one nest on the HRA at New River, we banded two hatched chicks in the morning and returned in the afternoon to band the third chick, which was not hatched in the morning. Upon returning we found the third unbanded chick in the nest bowl, and the other two chicks missing. Raven tracks were around the nest exclosure and the vicinity around the nest. The adult male plover was seen briefly, but did not appear to have the two banded chicks. We federally banded the third chick, and left the area. This third chick was the only chick to fledge from the brood. We suspected that the ravens harassed the hatching nest and depredated the first two chicks as they attempted to exit

the nest enclosure. At CBNS, on the 94HRA, we visited a hatching nest to band the chicks. Upon arrival, we found the enclosure surrounded by raven tracks, with evidence that the ravens were attempting to enter the enclosure by scraping at the base of the enclosure. Two eggs had hatched, but the two chicks were missing. The third egg was infertile. The adults were present and acting broody, however we found the male brooding a chick that had been banded the previous day from another brood. The male raised this chick to fledgling, and neither of the two unbanded chicks was ever accounted for. We checked the other enclosed nests on the 94HRA and found that the ravens had investigated and attempted to enter at least one other enclosure. At North Siltcoos late in the season, we visited a hatching nest and found raven tracks surrounding the enclosure. Both adults were present, and acting somewhat broody. The chicks could not be found, even after watching the adults from a distance. It was suspected at the time that the ravens might have depredated the chicks. One unbanded fledgling was eventually seen and believed to have been from this brood, but we suspect that the other chicks were depredated.

Despite predator management, the nests initiated in early April 2004 had a high failure rate mostly due to depredation. By the beginning of May, many female plovers had initiated a second nest. We were concerned that if these second nest attempts continued to fail, that many females would then be laying their third clutch of eggs by the end of May. High rates of failure result in high numbers of eggs laid in a season, and we have noted that the more eggs females lay, the more likely those eggs are infertile (ONHIC unpublished data). We have also expressed concern that high numbers of eggs laid in a season may have negative physiological effects on the females, and may influence the rate of survival of females in the following winter (Castelein et al. 2001). We typically delay erecting nest enclosures until 15 May (as do some areas in California), as evidence indicates that many adult depredations around enclosures occur in the first half of May (Lauten et al. 2004). Delaying enclosure erection is an attempt to avoid attracting migrating raptors to nests. In 2004, we elected to begin selectively erecting enclosures in late April and early May. By the second week of May, we had erected enclosures around most active nests. This resulted in fewer nest failures, and other than the one adult male depredated by a feral cat, no other known adult depredations due to predators targeting enclosures were recorded. We observed no evidence of raptors being attracted to MEs in 2004.

Nest Failure

Enclosed nests in 2004 had a very low overall failure rate, 15% (12 of 81), compared to the three previous seasons (23% in 2003, 34% in 2002, and 32% in 2001). Unenclosed nests continue to experience a very high rate of nest failure: 33 of 36 in 2004, 32 of 35 in 2003, 31 of 33 in 2002, 54 of 54 in 2001, and 21 of 21 in 2000. Overall nest failures were attributed to unknown depredation (40%), abandoned (20%), unknown cause (13%), corvid depredation (11%), infertility (7%), mammalian depredation (7%, one each for cat, red fox (*Vulpes vulpes*), and skunk (*Mephitis mephitis*)), and wind/weather (2%; Table 6). No enclosed nests failed due to depredation, however a cat depredated a male plover at an enclosed nest, and after the enclosure was removed, the

cat returned and depredated the eggs (Table 7). The main cause of nest failure of exclosed nests was abandonment and unknown cause (n=4 for both, 31% each), followed by infertility (n=3, 23%). One other exclosed nest was buried by wind blown sand. The main cause of failure for unexclosed nests was depredation of eggs (total n=26, 81%; unknown predators n=18, 56%; corvids n=5, 16%; cat, skunk and red fox, n=1 each, 3%). Unknown cause and abandonment, including two one egg nests, caused the remaining nest failures.

The majority of egg depredations (69%) were due to unknown predators; it is likely that most of these failures were caused by corvids, but rain and wind erased evidence at these nest sites.

Of the nests classified as unknown cause two were not exclosed; both nests were in areas that were overwashed, but may have failed due to depredation prior to overwashing. Of the four exclosed nests that failed to unknown cause, it was possible that three may have had adults depredated but not necessarily in or near the exclosure. Two of the three nests had known adults, and one adult from each of these nests disappeared during incubation. At the third nest, the male was unknown, but it appeared that the female might have been incubating the nest without the assistance of a male. The female finally abandoned the nest. In all cases there was no evidence that an adult was depredated in or near the exclosure.

Fledgling Success

In 2004, 73 broods, including two broods from undiscovered nests, was the highest number of broods ever monitored. The previous high was in 1996 (61). This was an increase from 2003 of 23 broods and nearly double the number of the previous three seasons (average 40 broods). A total of 107 fledglings were confirmed, the highest number of fledglings since monitoring began in 1990 and 47 more fledglings than our previous high of 60 in 2003 (Table 8). Overall fledgling success was 55%, the highest rate since monitoring began in 1990 and 17 percentage points higher than the overall average of 38% (Table 9). The overall number of fledglings per brood was 1.46 (107/73) and the overall number of fledglings per male was 1.73 (59/46, Table 10).

The overall brood success rate was 88% (Table 10) compared to 70% in 2003 and 48% in 2002. Brood success rates improved or stayed high at all sites compared to 2003 (see Lauten et al. 2003). Brood success at Siltcoos was 100%. Overlook and Tahkenitch in 2004 had brood success rates over 67% compared to 50% or less in 2003. At Tenmile in 2004, productivity continued to be very good, with 73% brood success compared to 55% in 2003. Only North Tenmile had a brood success rate less than 67%, but still 60% of the broods were successful, a considerable improvement over 2003 (25%). At CBNS, overall brood success remained very high (94% in 2004 compared to 100% in 2003). At Bandon Beach, brood success improved from 67% in 2003 to 85% in 2004, and at New River, overall brood success improved from 80% in 2003 to 94% in 2004. Although there was no significant difference ($\chi^2 = 2.997$, $df = 1$, $P > 0.05$), the overall brood success rate for sites without predator management in 2003 (Siltcoos, Overlook, and

Tahkenitch; 47% in 2003) was considerably higher in 2004 with predator management (89%).

Fledgling success rates at all sites except North Tenmile were higher than the overall average fledgling success rate (compare Table 10 to Table 9). Individual site fledgling success rates were higher or equal to the average for each individual site (compare Table 10 to Figure 12). At Siltcoos, 66% of the chicks that hatched fledged compared to 40% in 2003. At Overlook and Tahkenitch, fledgling success rates were over 40% in 2004 compared to 33% or less in 2003. At Tenmile, the combined fledgling success rate in 2004 was 41%, down from 50% in 2003. However, North Tenmile, despite being the only site with relatively poor fledgling success rate, still improved from 2003 (25% in 2004 compared to 14% in 2003). At South Tenmile, while the fledgling success rate declined from 2003 (69% in 2003 compared to 53% in 2004), the overall productivity of this site in 2004 was still excellent. At CBNS, the overall fledgling success rate remained excellent (73% in 2004 compared to 72% in 2003). At Bandon Beach, fledgling success improved from 33% in 2003 to 45% in 2004. At New River, overall fledgling success in 2004 was 57% compared to 48% in 2003, and double the average for this site (29%, Table 10 and Figure 12). The overall fledgling success for sites without predator management in 2003 (Siltcoos, Overlook, Tahkenitch; 25% in 2003) was significantly lower than the overall fledgling success for these sites with predator management in 2004 (52%; $\chi^2 = 4.27$, $df = 1$, $P < 0.05$).

The overall number of fledglings per male was 1.73 in 2004, compared to 1.30 in 2003 (Table 10). At Siltcoos, the overall fledglings per male was 2.40 in 2004, an increase from 0.50 in 2003. North Siltcoos had the highest fledglings per male of all sites in 2004: 2.33. Overlook improved from 0.75 in 2003 to 1.00 in 2004, and Tahkenitch improved from 0.45 overall in 2003 to 1.20 in 2004. Overall, sites without predator management in 2003 improved from 0.50 fledglings per male to 1.50 fledglings per male in 2004 with predator management. At Tenmile, 0.75 fledglings per male on the north side was the only site with less than one fledgling per male in 2004, however, that was still an improvement from 2003 when 0.33 fledglings per male was recorded. South Tenmile declined from 2.25 fledglings per male in 2003 to 1.50 fledglings per male in 2004. Overall, Tenmile slightly decreased from 1.43 fledglings per male in 2003 to 1.20 fledglings per male in 2004. CBNS continues to be very successful: 2.16 fledglings per male in 2004 compared to 2.40 in 2003. Bandon Beach improved in 2004 to 1.50 fledglings per male compared to 0.80 in 2003, and New River also improved from 1.20 fledglings per male in 2003 to 1.75 in 2004.

At North Siltcoos, seven fledglings in 2004 were more fledglings than all other years combined for this site (Table 8). Twelve total fledglings for Siltcoos was nearly double the highest number of fledglings ever produced in a single year at this site. Six fledglings from Overlook is also the highest number of fledglings produced from this site. The three fledglings produced at North Tenmile equaled the highest number of fledglings ever produced there, and despite a slight drop in the fledgling success and fledglings per male in 2004, the total of 12 fledglings produced at Tenmile is the most from this site since 1992. The total of 35 fledglings at CBNS was the highest ever produced at this site

or any site and was higher than the total number of fledglings produced at all sites in some years. At Bandon Beach, 15 fledglings was three times higher than the previous high total for this site, and nearly doubled the total number of fledglings that have been produced at this site. The 21 fledglings produced at New River was also the highest ever produced at this site, and was nine more fledglings than the previous high (in 2003 and 1995).

Captive Reared Plovers

The female plover raised at the Newport Aquarium in 2002 (see Castelein et al. 2002) and present at New River in 2003 was not recorded in 2004. A second female raised in captivity at the Monterey Aquarium in California in 2002 who was present at New River/Bandon Beach in 2003 (see Lauten et al. 2003) returned to this same area in 2004. She attempted to nest two times at New River and two times at Bandon Beach. Both nesting attempts at New River failed, and both nesting attempts at Bandon Beach successfully hatched. One chick from each of the broods successfully fledged.

Brood Movements

Previous reports have documented the unpredictability and variable movements of broods (Castelein et al. 1997, 1998, 2000a, 2000b, 2001, and 2002, and Lauten et al. 2003). This trend continued in 2004. Some movements were very small while other broods moved up to several miles from the nesting location.

At Siltcoos, two broods hatched on the north spit crossed the river to the south spit; one brood made the crossing about a week after hatching. One brood from the south spit also crossed the creek to the north spit. Two other broods from the south spit moved to Overlook within two weeks of hatching and fledged at Overlook. A brood from South Overlook moved to South Siltcoos within two weeks of hatching. Two other broods from Overlook were noted using both clearings during the brood rearing period. All broods from Tahkenitch stayed on the Tahkenitch spit until fledged. At North Tenmile, there was some brood movement to the north of the spit along the beach, but the majority of brood rearing occurred in and around the nesting area and spit. At South Tenmile, broods tended to stay within the nesting area and adjacent beach, however one brood moved south and was noted using the beach north of the motor vehicle closure sign.

At CBNS, broods continue to move to the beach from the HRAs and spoil. Some broods moved to the beach within days of hatching, while other broods moved to the beach later in the brood rearing stage. Once on the beach, broods were noted as far north as several hundred meters south of the FAA towers and as far south as the jetty area. We noted brood use south of the roped area near the jetty, including the fill area just east of the beach. On one occasion two 26-day-old chicks were found on the foredune road between the jetty and the gate at the south end of the closed foredune road. The chicks eventually turned south, ran onto the bay beach, and then crossed back to South Beach using the roads that run adjacent to the base of the jetty between the bay beach and the north jetty. There was very limited use of the 98EHRA, partly due to the extensive

vegetation on this area, which limits the available habitat for the plovers. Once fledged, all chicks moved to the beach.

At Bandon Beach, most brood activity remained on or adjacent to the HRA. There was some brood movement north of the HRA along the beach, but none of the broods went as far north as the Christian Camp trail or the China Creek area. One brood hatched on the HRA crossed New River and spent the majority of their time on the open spit on the south side of the mouth of the river. Two broods from New River also crossed the river and moved north to the Bandon Beach side, where they completed the brood rearing stage. Brood use of the New River spit, including state and county land, was extensive. Broods were noted using the beach and the riverside of the spit. One brood hatched on the open spit moved south to the HRA adjacent to Storm Ranch and finished the brood rearing stage on the HRA. Some broods hatched on county or state land and on the open beach adjacent to private land spent much of their time along the open beach south of the spit and north of the HRA. Several broods that hatched on the HRA were raised on the HRA, but several others moved north and finished the brood rearing stage along the open beach adjacent to private land. No broods moved south along the HRA towards the breach.

Activity Patterns on HRAs

Table 11 shows the activity patterns of plovers on four habitat restoration areas: the Overlook, the HRAs at CBNS, Bandon Beach HRA, and the New River HRA. We were unable to confirm all types of activity on each site for each year, therefore a missing activity does not necessarily indicate that that behavior is not occurring, rather we have not confidently identified that behavior for that given site and year.

2003 Hatch-Year Returns

Twenty-six of the 60 hatch-year 2003 plovers returned to Oregon this year. The return rate was 43%, slightly below the average return rate of 48% (Table 12). Of the returning 2003 hatch-year birds, 15 (58%) were females and 11 (42%) were males (Table 13). Twenty-one of the hatch year 2003 returning plovers attempted to nest (81%), and they accounted for 20% of the banded adults.

Sightings of Snowy Plovers Banded Elsewhere

Sixteen plovers banded in California were observed in Oregon in 2004. Ten were females and six were males. Fourteen of the plovers, six males and eight females, attempted to nest in Oregon. Two females and one male originally hatched in Oregon and were subsequently rebanded at coastal nest sites in California; all three attempted to nest in Oregon.

Five males and two females were originally banded in Humboldt Co., CA; one female was recorded just once in June and a second female was present from April until mid-July but no known nest was associated with her. Six other females were banded

elsewhere in California: one female raised in captivity at Monterey Aquarium in 2002, returned and nested for the second consecutive year at New River and Bandon Beach; one female fledged in 2003 from Salinas St. Beach, Monterey Co. and nested at S Overlook; one female fledged in 2003 from Camp Pendleton, San Diego Co., and nested at New River; one female fledged in 2002 from Sunset Beach, Santa Cruz Co., and attempted to nest at N Tenmile for the second consecutive year; one female was originally banded at Salinas St. Beach, Monterey in 2002, and nested for the second consecutive year at N Tahkenitch; and one female was originally banded at Marina St. Beach, Monterey in 2002, and nested at Bandon Beach.

Discussion

After six years of plover populations ranging from 95-113, there was an increase of approximately 35 adult plovers along the Oregon coast in 2004 (Table 1). Despite high fledgling numbers in 2003 ($n=60$), hatch year return rates remained about average (43%, $n=26$, Table 12), thus the increase in the plover population cannot be attributed to hatch year returning plovers. Of the banded adults recorded in 2003, approximately 26 individuals did not return to Oregon in 2004 and are presumed deceased. The number of returning hatch year 2003 plovers only replaces the adults lost to mortality over the winter of 2003-2004. Therefore the population increase was a result of an influx of plovers from other breeding locations. Some evidence for this is the high number of unbanded adult plovers that were banded on the Oregon coast in 2004 ($n=18$), the highest number of unbanded adults subsequently banded in one season since monitoring began in 1990. Colwell et al. (2004) also reported a relatively high influx of immigrant plovers into the Humboldt Co., CA population in 2004. Oregon breeding populations apparently benefited from high plover productivity in many coastal California locations in 2003 (G. Page, pers. comm.).

March and early April were very dry, resulting in early nest initiations but most of these nests failed to depredations (Fig. 9). Late April was wetter, slowing re-nesting attempts, but by early May the number of active nests increased and remained the highest number of active nests over 10-day time intervals since monitoring began in 1990 until early July. Due to the early season nesting attempts and failures, many females had already laid a second clutch by early May. We were concerned about further nest failures and the resulting physiological effects on female plovers, so we began to exclose nests in late April and early May, approximately one to two weeks before we typically begin exclosing most nests. Despite the earlier erection of nest exclosures, we did not document any adult mortality in or around exclosures due to avian predators targeting exclosures, and nest depredations and failures decreased.

While predator management efforts have reduced predation pressure on nesting plovers, use of exclosures continues to be an important management tool to increase hatching rates, as unexclosed nests are still being depredated at a high rate (Table 8). We may have been able to leave nests unexclosed at CBNS, but due to the presence of a herd of elk that spent a considerable amount of time in and around the HRAs and spoil area, exclosures were erected to keep the elk from crushing nests.

We expanded the use of MEs to all sites and all nests in 2004, which resulted in no egg depredations once exclosures were erected (Table 7). The use of MEs contributed to the overall high rate of nest success, however we did experience a number of incidents where ravens harassed hatching nests and depredated newly hatched chicks as they exited the MEs. We also documented one adult depredation by a feral cat at an exclosed nest. One disadvantage of the MEs is it permits predators to get very close to the nests, potentially see what is inside the exclosure, prevents adult plovers from the ability to flush away, and does not give the chicks much protection once they leave the nest bowl. Therefore it is extremely important that predator management efforts are well coordinated with nest activity. Several of the raven incidents occurred when there was a stoppage in raven removal due to a permit issue concerning the number of ravens permitted to be taken. We strongly recommend that all permits are in place prior to the nesting season and that the number of allowable take is sufficient to reduce incidents such as these from taking place. We continue to believe that MEs are a useful tool protecting nests, however we still recommend reducing the number of days exclosed and eventually cease the use of exclosures altogether.

Predator management for corvids implemented at all sites was the most substantial management action that occurred in 2004. At Forest Service sites (Siltcoos, Overlook, and Tahkenitch) where no corvid management occurred in 2003, there were considerable improvements in brood success, fledgling success, and the number of fledglings per male in 2004 compared to 2003. At North Tenmile, the reasons for the relatively poor productivity were not clear, but improved habitat and continued predator management will hopefully result in better productivity from this isolated nesting area. For all sites, brood success, fledgling success, and fledglings per male were higher than the goals outlines in the draft recovery plan. We believe the data indicate that predator management, particularly for corvids at all sites and for red fox at New River/Bandon Beach, had an overall positive effect on productivity. Continuation of the predator management program is an essential part of the overall program to increase and maintain productivity in order to reach recovery goals.

Improvement and maintenance of habitat restoration areas continues to be an essential part of the overall program to increase productivity and reduce disturbance to the plovers. Plovers responded to the improved habitat restoration area at Bandon Beach by having the highest number of nests ever at Bandon Beach, and, in combination with predator management, had the most successful year in terms of producing fledglings at this site. In addition, roping the entire area resulted in no violations of the nesting area. Male plovers kept their broods on or adjacent to the habitat restoration area and along the beach just north of the habitat restoration area. Due to the distance from the China Creek parking lot, recreational disturbance was generally minimal. At New River, there was not a substantial increase in the use of the habitat restoration area, however one nest was further south than any nest found on the HRA to date. Productivity from the nests on this area continues to be excellent, and broods from both nests on the habitat area and nests from other areas used the HRA for brood rearing. In general this area has excellent habitat for plover nesting and brood rearing, and we suspect that if populations continue

to increase use of the area will also increase. On Forest Service lands, most sites did not have a substantial increase in available habitat, and at Tahkenitch winter erosion actually eliminated the entire south spit, the first year since 1993 that no nests were found on the south side. The north spits of Tenmile, Tahkenitch, and Siltcoos all naturally increased in size in 2004, and plovers responded by occupying or increasing use of the north spits (and decreased use of the south spits). Maintenance and improvement of all these sites is an important management action to help reach recovery. We continue to recommend that a substantial improvement of habitat at North Tenmile be implemented. This site is relatively remote, has very low recreational disturbance, and has substantial habitat that can be improved for plovers. There was an increase in habitat at Sutton Beach in 2004, but unfortunately plovers abandoned the site after winter and apparently did not attempt to nest anywhere at Sutton Beach. Plovers were noted using this location in fall of 2004 (Fred Seavey, Dylan Little, pers. comm.). We believe that continued habitat improvement at Sutton Beach may attract nesting plovers in the future, and that this site is important for expanding plover populations.

Management of recreational activities is also an essential aspect of overall plover management. In 2004, we believe that the recreational management efforts of all agencies were excellent and contributed to the success of the plover nesting season. We believe the presence of seasonal employees and volunteers at New River, Bandon Beach, CBNS, and Siltcoos to Tahkenitch, and the on the beach patrolling by law enforcement officers of BLM, USFS, and state and county law enforcement agencies contributed to a season with minimal numbers of serious violations. Pro-active educational contact by employees, volunteers, and law enforcement contributes to a better understanding by the public of beach rules and restrictions and plover biology, and potentially reduces the number of violations because of the awareness that the beaches are being monitored and patrolled. Violations such as dogs off leash, vehicles in closed areas, and vandalism of signs and ropes do continue and therefore we recommend that agencies continue to fund and staff recreational management personnel.

Habitat Restoration and Development Projects

The USFS continued habitat restoration projects at Sutton Beach in the winter of 2003-04. Bulldozers have now cleared 12 acres north of Berry Creek and 8 new acres of clear habitat has been created south of Holman Vista. Both areas are scheduled for further maintenance and improvement in the winter of 2004-05. Spreading woody debris or shell hash on the areas may attract plovers as well as improve nesting potential.

At Siltcoos, maintenance clearing of 10 acres was completed on the south spit in the winter of 2003-04.

At the Overlook, maintenance clearing was completed on 30 acres in the winter of 2003-04.

At Tenmile, maintenance clearing of 15 acres on the south side was completed in the winter of 2003-04.

At CBNS in winter 2003-04, BLM maintained the habitat on their portion of the 95 and 98HRA. Agreements were reached between Army Corp, BLM, and USFWS in late winter to maintain the habitat on the 94HRA. The 95HRA west of the 94HRA did not have any maintenance. Grass is filling in this area and degrading the area for nesting. Army Corp (J. Craig, pers. comm.) does not want to destabilize the foredune and does not want to maintain the 95HRA, however, they agreed that corridors can be established between the foredune road and the beach to facilitate movement of broods from the 94HRA/South Spoil nesting areas to the beach. Corridors would be approximately 10 feet wide paths free of vegetation that permit plovers (especially chicks) to move to the beach. No sand would be moved to establish these corridors; vegetation would be scalped from the top of the sand. Agreements and funding to maintain the 94HRA and other Army Corps lands need to be completed. We recommend that work in this area be accomplished by mid to late February. BLM has completed a project to improve the 98HRA on BLM land by using a large tractor and rake to remove vegetation. Currently there are ongoing attempts to find shell hash to spread on the area to further improve the nesting substrate.

At the south end of Bandon Beach by the Twomile Creek/New River estuary an additional 30 acres was restored in the winter of 2003-04, bringing the total area restored to 50 acres. This area will be maintained in the winter of 2004-05; no new acres are necessarily needed.

At New River, BLM has now created and maintained 160 acres, or 2.75 miles, of habitat restoration. This area is slated for maintenance in the fall of 2004. The habitat on the HRA is improving every year.

Recommendations

Signing of Restricted Areas

Signing and roping for the 2005-nesting season should again be implemented to inform the public of plover nesting habitat. Each season signs and symbolic fencing are erected to direct the public away from the nesting areas. High tides early in the season often make posting areas a challenge, but it is important to have signs in place beginning on 15 March. Plover monitors can inform the different land management agencies of any obvious maintenance needs at a particular site if problems arise. It is important that the signs are maintained to keep violations to a minimum. To maximize the effectiveness of signs and ropes each site should continue to be evaluated at the end of each nesting season and ways to improve the signing and ropes for the next season should be considered. The outreach committee is working on improving and creating some new signs.

General Recommendations

Below are general recommendations. We also provide additional site-specific comments and management recommendations in Appendix B.

- Maintain, enhance and in some cases expand habitat restoration areas.
- Continue and expand use of mini-exlosures in conjunction with predator management to reduce the risks to adult plovers, decrease the time monitors spend around individual nests, and decrease disturbance to plovers. Continue to erect predator exclosures around nests after 15 May to reduce attacks by migrating falcons. Ultimately move toward elimination of exclosures at all sites.
- Increase and/or maintain predator management at all sites and explore ways of better understanding the activity patterns and population levels of predators, particularly corvids.
- Continue to coordinate with federal agency employees regarding time frames of any habitat management work to be completed to minimize disturbance to nesting activity and broods.
- Coordinate agency activities in restricted/closed areas with plover biologists to minimize disturbance to nesting and brood rearing.
- Continue and explore ideas to document and monitor human disturbance by various recreational users in plover nesting areas.
- Continue to expand and refine volunteer efforts to monitor recreational use.
- Design educational programs to inform and educate the local communities and annual visitors about plover issues.
- Design informative/interactive presentations for schools for children.
- Continue intensive breeding season monitoring until plover numbers have reached the goals to be established in the USFWS Recovery Plan for Snowy Plovers, then monitor plover populations and productivity to ensure recovery goals are maintained.
- Consider employing a coastal regional coordinator for plover management to facilitate communication between all federal and state agencies.

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Table 1. Population estimates of the Western Snowy Plover on the Oregon Coast, 1990-2004. For Window Survey, first number is counted plovers minus duplicate band combos and unidentified plovers, number in parenthesis is total head count without considering duplicate combos or unknown plovers.

YEAR	WINDOW SURVEY	# SNPL BREEDING	# SNPL PRESENT
1990	59	-	-
1991	35	-	-
1992	28	-	-
1993	45	55-61	72
1994	51	67	83
1995	64 (67)	94	120
1996	85	110-113	134-137
1997	73 (77)	106-110	141
1998	57 (59)	75	97
1999	49 (51)	77	95-96
2000	NC	89	109 ^a
2001	71 (85)	79-80	111-113 ^b
2002	71 (76)	80	99-102 ^c
2003	63	93	102-107 ^d
2004	82 (83)	120	136-142 ^e

^a - includes 13-15 adult plovers that were depredated during the breeding season

^b - includes at least two adult male plovers that were depredated and 1M and 1F thought to have been depredated during the breeding season

^c - includes at minimum of 6 adult plovers that were depredated and another 4 that possibly were depredated during the breeding season

^d - includes 2 adult female plovers that were probably depredated during the breeding season

^e - includes 2-3 males and 1-2 females believed to have depredated during the breeding season

Table 2. Distribution and abundance of adult Snowy Plovers along the southern Oregon coast during the 2004 breeding season.

Site Name	Mean (x)	SD	Range	# Surveys (n)^a	Date of Peak Count	Dates of Surveys
Sutton Beach	0.13	0.52	0-2	15 (15)	9 April	9 April – 20 Aug
North Siuslaw	0.00	0.00	0	4 (4)	n/a	9 April – 26 Aug
Siltcoos:						
North Spit	5.45	5.62	0-28	33 (51)	9 Sept	7 April – 9 Sept
South Spit	1.95	1.92	0-8	38 (55)	25 June	7 April – 9 Sept
Overlook:						
North	4.95	2.95	0-12	37 (66)	29 April	7 April – 9 Sept
South	2.67	2.22	0-9	36 (52)	3 May	7 April – 9 Sept
Tahkenitch:						
North	4.74	3.23	0-12	34 (56)	15 June	8 April – 9 Sept
South	-	-	-	-	-	-
Tenmile:						
North	3.46	2.60	0-9	39 (59)	20 July	7 April – 7 Sept
South	4.83	2.99	0-10	29 (39)	14 July	6 April – 7 Sept
Coos Bay N.S.:						
South Beach	10.82	3.87	3-18	28 (32)	29 April, 23 July	5 April – 27 Aug
South Spoil	2.77	3.21	0-10	22 (38)	24 May, 26 June	5 April – 10 Aug
HRA '94	7.65	6.79	0-21	23 (41)	12 June	5 April – 13 Aug
HRA '95	0.33	0.49	0-1	18 (21)	-	5 April – 3 Sept
Bandon	7.65	4.95	1-17	34 (72)	3 July	10 April – 10 Sept
New River	11.58	3.04	7-18	26 (68)	19 June	10 April – 10 Sept
Floras Lake	0.00	0.00	0	8 (8)	-	2 April – 5 Aug

^a – first number is total number of complete surveys, number in parenthesis is total number of visits to the site

Table 3. Total number of nests for all sites on the Oregon Coast 1990 – 2004; cells tally nests only and not broods from undiscovered nests. The number of broods from undiscovered nests is totaled for each year and site only.

Site Name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total # nests	Total # broods ^a
Necanicum													1	0	0	1	1
Sutton Beach				2	1	2	6	14	8	3	7	15	3	1	0	62	1
North Siuslaw													1	0	0	1	0
Siltcoos:																	
North Spit				0	2	4	2	0	1	4	8	0	0	0	7	28	0
South Spit				1	2	2	1	3	3	17	14	14	10	7	4	78	0
Overlook																	
North										2	8	12	5	8	11	46	1
South										0	0	3	3	1	3	10	0
Tahkenitch:																	
North Spit				0	0	0	0	0	0	0	4	7	8	13	8	40	0
South Spit				0	3	9	18	14	6	3	1	6	7	1	0	68	2
Threemile Creek/ Umpqua River				0	0	0	1	0	0	0	0	0	0	0	0	1	0
Tenmile:																	
North Spit					2	2	1	0	0	0	1	2	3	5	9	25	1
South Spit	2	0	9	8	5	4	3	2	11	5	5	6	9	11	8	88	2
Coos Bay North Spit:																	
South Beach	0	4	6	3	4	3	3	6	6	0	1	1	2	3	2	44	9
South Spoil	20	9	4	6	9	12	22	14	5	2	5	3	2	9	8	130	13
North Spoil	5	1	1	0	0	0										7	0
Habitat Rest. Areas					4	3	2	3	7	12	22	13	15	11	16	108	11
Anad. Spoil	0															0	1
Menasha, N.Bend	1	0														1	0
Bandon	0	14	8	10	5	9	3	4	1	2	2	6	5	5	17	91	3
New River	6	6	2	0	6	20	18	25	26	28	17	23	14	16	24	231	6
Floras Lake/ New River Overwash	2	2	6	11	8	6	9	8	4	0	5	0	1	0	0	62	3
Total nests	36	36	36	41	51	76	89	93	78	78	100	111	89	91	117	1122	
Total broods^a	2	1	5	7	4	6	11	5	3	1	2	0	1	4	2		54

^a – broods from undiscovered nests only; these broods are not tallied in the total number of nests

Table 4. Nest Success (Mayfield Method) of Snowy Plovers on the Oregon coast, 1990-2004.

Year	% Nest Success		(N) ¹	(N) ²
	Overall ¹	Exclosed ²		
1990	13	- ³	13	(36) (29)
1991	20	77	5	(36) (33)
1992	55	79	9	(36) (34)
1993	56	77	16	(41) (39)
1994	72	75	68	(51) (47)
1995	41	62	7	(76) (70)
1996	47	66	7	(89) (87)
1997	40	52	26	(93) (87)
1998	52	70	15	(78) (70)
1999	54	62	40	(78) (72)
2000	31	46	2	(100) (91)
2001	26	67	4	(111) (101)
2002	38	67	13	(89) (76)
2003	43	79	23	(91) (79)
2004	56	86	20	(117) (109)
mean	42.9 ± 15.7	68.9 ± 11.0	17.9 ± 17.1	(1122) (1026)

¹Overall includes exclosed nests, unexclosed nests, infertile nests, and nests with one egg that were subsequently abandoned.

²Does not include infertile nests or nests with one egg that were subsequently abandoned because the outcome of these nests was not affected by the presence or absence of an exclosure.

³Exclosed nests not included as multiple experimental designs were employed.

Table 5. Apparent nest success of Snowy Plovers on the Oregon Coast, 2004.

Site	Total #	Nests Exclosed		Nests Not Exclosed		Exclosed Nests	Nests Not Exclosed	Overall Nest Success
		Hatched	Failed	Hatched	Failed	App Nest Success	App Nest Success	
Sutton	0	-	-	-	-	-	-	-
Siltcoos								
North	7	4	1	0	2	80	0	57
South	4	3	0	0	1	100	0	75
Overlook								
North	11	3	2	0	6	60	0	27
South	3	3	0	0	0	100	-	100
Tahkenitch								
North	8	6	1	0	1	86	0	75
South	0	-	-	-	-	-	-	-
Tennile								
North	9	5	2	0	2	71	0	56
South	8	6	1	0	1	86	0	75
CBNS								
South Beach	2	0	1	0	1	0	0	0
South Spoil	8	5	0	1	2	100	33	75
HRAs	16	8	1	2	5	89	29	63
Bandon	17	13	1	0	3	93	0	76
New River								
HRA	6	4	0	0	2	100	0	67
Other Lands	18	9	2	0	7	82	0	50
Floras Lake	0	-	-	-	-	-	-	-
Totals	117	69	12	3	33	85	8	62

Table 6. Causes of Snowy Plover nest failure at survey sites along the Oregon coast, 2004.

Site Name	Total Nests	# Fail	Depredation					Other				
			Egg Depredation					Wind/ Weather	Infertile	Abandon ^a	Unk cause	
			Corvid	Unk	Feral Cat	Red Fox	Skunk					
Siltcoos:												
North	7	3									3	
South	4	1										1
Overlook												
North	11	8		6							1	1
South	3	0										
Tahkenitch												
North	8	2		1								1
South	0											
Tennmile:												
North	9	4		2				1				1
South	8	2		1					1			
Coos Bay												
North Spit:												
South Beach	2	2	1						1			
South Spoil	8	2	1							1		
HRAs	16	6		2	1					3		
Bandon	17	4	1	1		1				1		
New River	24	11	2	5			1				1	2
TOTALS	117	45	5	18	1	1	1	1	3	9	6	

^a – includes 2 one-egg nests that never completed the clutch

Table 7. Cause of failure for Snowy Plover nests protected by predator exclosures and nests unprotected by predator exclosures along the Oregon coast, 2004.

Cause of Failure		Exclosed	Unexclosed	Totals
Egg Depredation	Corvid		5	5
	Unknown		18	18
	Feral Cat		1 ^b	1
	Skunk		1	1
	Red Fox		1	1
Other	Wind/Weather	1		1
	Infertile	3		3
	Abandoned^a	4	5	9
	Unknown Cause	4	2	6
Totals		13	32	45

^a – includes 2 one-egg nests (clutches never completed)

^b – nest was exclosed, male was depredated, exclosure was pulled, cat returned and depredated eggs – see text.

Table 8. Total number of young fledged for all sites on the Oregon Coast 1990-2004; includes fledglings from broods from undiscovered nests.

Site Name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	TOTALS
Necanicum											1	0	0	0	0	1
Sutton							0	1	1	0	3	0	0	0	0	5
N Siuslaw													0	0	0	0
Siltcoos:																
North Spit					0		0	0	2	4	0	0	0	0	7	13
South Spit					1	2	0	0	4	2	7	0	0	2	5	23
Overlook																
North										3	5	1	2	3	3	17
South										0	0	1	0	0	3	4
Tahkenitch																
North					0	0	0	0	0	0	2	4	1	3 ^A	6	16 ^A
South					1	12	8	7	1	1	3	4	5	2	0	44
Tenmile:																
North Spit					0	1	0	0	0	0	0	0	3	1	3	8
South Spit			14	7	3	3	4	4	3	7	5	4	3	9	9	75
Coos Bay																
North Spit:																
South Spoil	3	2	4	13	17	17	22	8	6	5	3	4	2	7	13	126
South Beach		11	9	2	6	2	2	7	2	0	0	1	1	3	0	46
HRAs					7	2	1	1	1	23	6	6	8	14	22	91
Bandon		1	1	3	5	0	1	0	1	1	0	1	0	4	15	33
New River			3	0	7	12	8	9	11	8	5	6	6	12	21	108
Floras Lake/ New River Overwash	0	2	2	11	9	6	1	3	0	0	3	0	0	0	0	37
TOTALS	3	16	33	36	56	57	47	40	32	54	43	32	31	60^A	107	647

^A – Added one fledgling based on sitings in WA in fall 2003 (DJL 4/21/04); there may be another fledgling from a brood at STA that has not been added to totals yet because of further need of confirmation.

Table 9. Overall Mayfield nest success, fledgling success and total number of fledglings on the Oregon Coast, 1990 – 2004.

Year	% Nest Success ^a	% Fledgling Success ^b	# Fledglings ^c
1990	13	11	3
1991	20	45	16
1992	55	41	33
1993	56	42	36
1994	72	50	56
1995	41	50	57
1996	47	32	47
1997	40	30	41
1998	52	26	32
1999	54	43	53
2000	31	41	43
2001	26	34	32
2002	38	29	31
2003	43	47	60
2004	56	55	107
	Mean = 42.9 _± 15.7	Overall = 38	Total = 647

a – Overall Mayfield Success from Table 4

b – does not include fledglings from broods from undiscovered nests

c – total number of fledglings including from broods from undiscovered nests

Table 10. Fledgling success, brood success, and number of fledglings per male for Snowy Plovers on the Oregon Coast, 2004.

Site Name	Total # Broods*	% Brood Success*	Total # Eggs Hatched	Min. # Fledged		% Fledgling Success**	# of Breeding Males ^a	# of Fledglings/Male
				From Known Nests	From Undiscovered Nests			
Sutton	-	-	-	-	-	-	-	-
Siltcoos:								
North Siltcoos	4	100	11	7	-	64	3	2.33
South Siltcoos	3	100	7	5	-	71	3	1.66
Overlook								
North Overlook	3	67	7	3	-	43	3	1.00
South Overlook	3	100	7	3	-	43	3	1.00
Tahkenitch								
North Tahkenitch	6	83	14	6	-	43	5	1.20
South Tahkenitch	-	-	-	-	-	-	-	-
Tenmile:								
North Spit	5	60	12	3	-	25	4	0.75
South Spit	6	83	17	9	-	53	6	1.50
Coos Bay N. Spit							All areas combined:	
South Spoil	5	100	17	13	-	76	18	2.16
South Beach	0	-	-	-	-	-		
HRA	12	92	25	18	4	72		
Bandon	13	85	33	15	-	45	10	1.50
New River							All areas combined:	
HRA	4	75	11	5	-	45	12	1.75
Other lands	9	100	26	16	-	62		
Floras Lake/New River Overwash	-	-	-	-	-	-	-	-
TOTALS**	73	88	187	103	4	55	62	1.73
TOTAL FLEDGED				107				

% Brood success = # broods with at least 1 chick fledged / total # of broods

% Fledging Success = # of young fledged / # of eggs hatched

* Includes broods from undiscovered nests:

** Does not include fledglings from undiscovered nests because we do not know how many eggs hatched from those nests.

^a – number of known individual breeding males for each site

^b – number of known breeding males in entire population; this is not a tally of known males from each site as some males may have nested at more than one location

Table 11. Activity patterns of Snowy Plovers on Habitat Restoration Areas along the Oregon Coast, 1994-2004. Note that absence of an activity type indicates we have not documented whether the activity is occurring. The Dunes Overlook and the New River HRA were first created in the winter of 1998-99. The 94HRA, 95HRA, 98HRA, and 98EHRA are all located at Coos Bay North Spit, and each was initially created in the winter of the respective year. The Bandon Beach State Park HRA was created in fall 2001 and significantly improved in fall 2002 and 2003.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Dunes Overlook						F?,N,B	F,N,B	R,F,N,B	R,F,N,B	R,F,N,B	R,F,N,B
94HRA*	F,N,B	F,B	F,N,B	F,N,B	R,F,N,B	R,F,N,B	R,F,N,B	R,F,N,B	R,F,N,B	R,F,N,B	R,F,N,B
95HRA		R,F,N,B	F,B	N,B	F,N,B	F,B	F,N,B	F?,N,B	R,F?,N,B	R,F,N,B	R,F,N,B
98HRA							N	F?,N,B	R?,F?,N	NA	NA
98EHRA								R?,F?,N,B	R?,F?,N,B	F,B	F,B
Bandon Beach									NA	R,F,N,B	R,F,N,B
New River						N	F,N,B	F,N,B	F,N,B	R,F,N,B	R,F,N,B

Type of activity: **R** = roosting, **F** = foraging, **N** = nesting, **B** = brooding, **?** = uncertain, no direct evidence, but activity possibly occurring, **NA** = no activity.

* - there is known winter use of the 94HRA; this is the only area with documented winter use

Table 12. Number of Snowy Plover fledglings, number of previous year fledglings returning, return rate, number nesting, and percent nesting in first year of return along the Oregon coast, 1990 - 2004.

Year	# of Fledglings	# of HY birds from previous year sighted on OR coast			
		Return Rate (#HY/#Fled)	# that nested on OR coast	% nested on OR coast	
2004	107	26	43%	21	81%
2003	60	14	45%	14	100%
2002	31	18	56%	15	83%
2001	32	23	53%	14	61%
2000	43	31	58%	25	81%
1999	53	18	56%	12	67%
1998	32	14	34%	11	79%
1997	41	30	64%	18	60%
1996	47	18	32%	10	55%
1995	57	37	66%	13	35%
1994	56	16	44%	8	50%
1993	36	10	30%	6	60%
1992	33	6*	38%	2	33%
1991	16	No chicks banded in 1990			
1990	3	x	x		

* - minimum number sighted

Average return rate = 47.6%

SD = 12.1%

Average percent of returning HY birds that nest in first season = 65%

SD = 19.5%

Table 13. 2003 hatch year Snowy Plovers that returned to the Oregon coast in 2004.

Chick Combos	New Combo	Sex	2003 Banding Location	2004 Location(s)	2004 Nest
A/R:B		F	S Tenmile	NR,BB	Yes
A/R:B	RG:BY	M	S Tenmile	NTA,SOV,NOV	Yes
A/Y:G	YW:WR	F	South Beach	BB,NR,NOV,NSI,SSI	Yes
B/A/B:B		F	South Beach	SB,SS,94HRA,SOV	No
B/W/B:B		F	S Siltcoos	NOV,SOV,NTA,NSI,SSI	Yes
B/Y/B:B	RL:WB	M	New River	NR,NOV,SOV,SSI,NSI	Yes
BW:B		F	N Tahkenitch	SS,SB,94HRA	No
B:B		F	Unknown	NR	No
G:B		F	Unknown	STM,SB,SS,94HRA	Yes
G:B		F	Unknown	NOV,NTM,NSI,NTA	Yes
L:B		M	Unknown	94HRA	No
L/B/L:B	LR:WB	M	94HRA	94HRA,SS,SB	Yes
L/R/L:B		F	New River	BB,STM,SB,94HRA,BB,NR	Yes
L/W/L:B		F	New River	NOV,SSI,NSI	Yes
L/W/L:B	RL:LB	F	New River	NR,NSI,NOV,BB,NTA	Yes
L/Y/L:B	RL:RB	M	S Tenmile	SB,SS,94HRA	Yes
L/Y/L:B	YW:LR	F	S Tenmile	BB,NR	Yes
R/B/R:B	LR:WB	F	New River	STM,NR,BB,NTM	Yes
RG:B	RG:BW	M	94HRA	94HRA,SB	Yes
RY:B		F	S Spoil	NTA,NSI	No
S:X	RY:GB	M	Bandon Beach	BB,NR	Yes
S:X	BR:YR	M	S Tenmile	94HRA,SS,SB	Yes
WG:B		M	95HRA	94HRA,SS,SB	Yes
WR:B		F	S Siltcoos	SB	Yes
X:S		M	Unknown	94HRA,SB,SS	Yes
YB:B		M	94HRA	SS,SB,94HRA	Yes

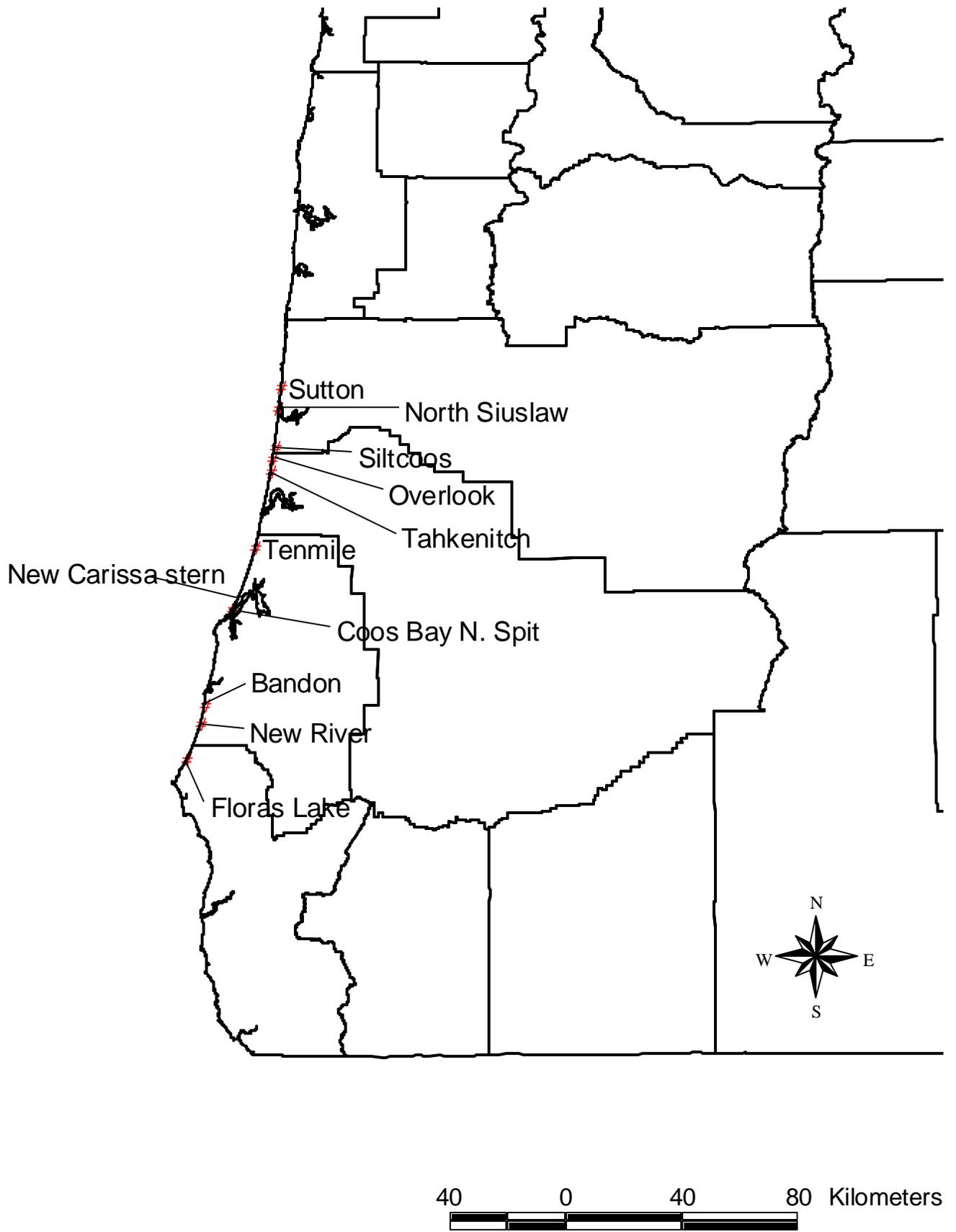


Figure 1. Snowy Plover nesting areas surveyed on the Oregon Coast in 2004.

Figure 2. Snowy Plover nest locations at Siltcoos River, Oregon, 2004.

Due to difficulties with our GPS unit, all 7 nest points at North Siltcoos are missing from this map. Revised maps will be circulated as soon as problem is resolved.

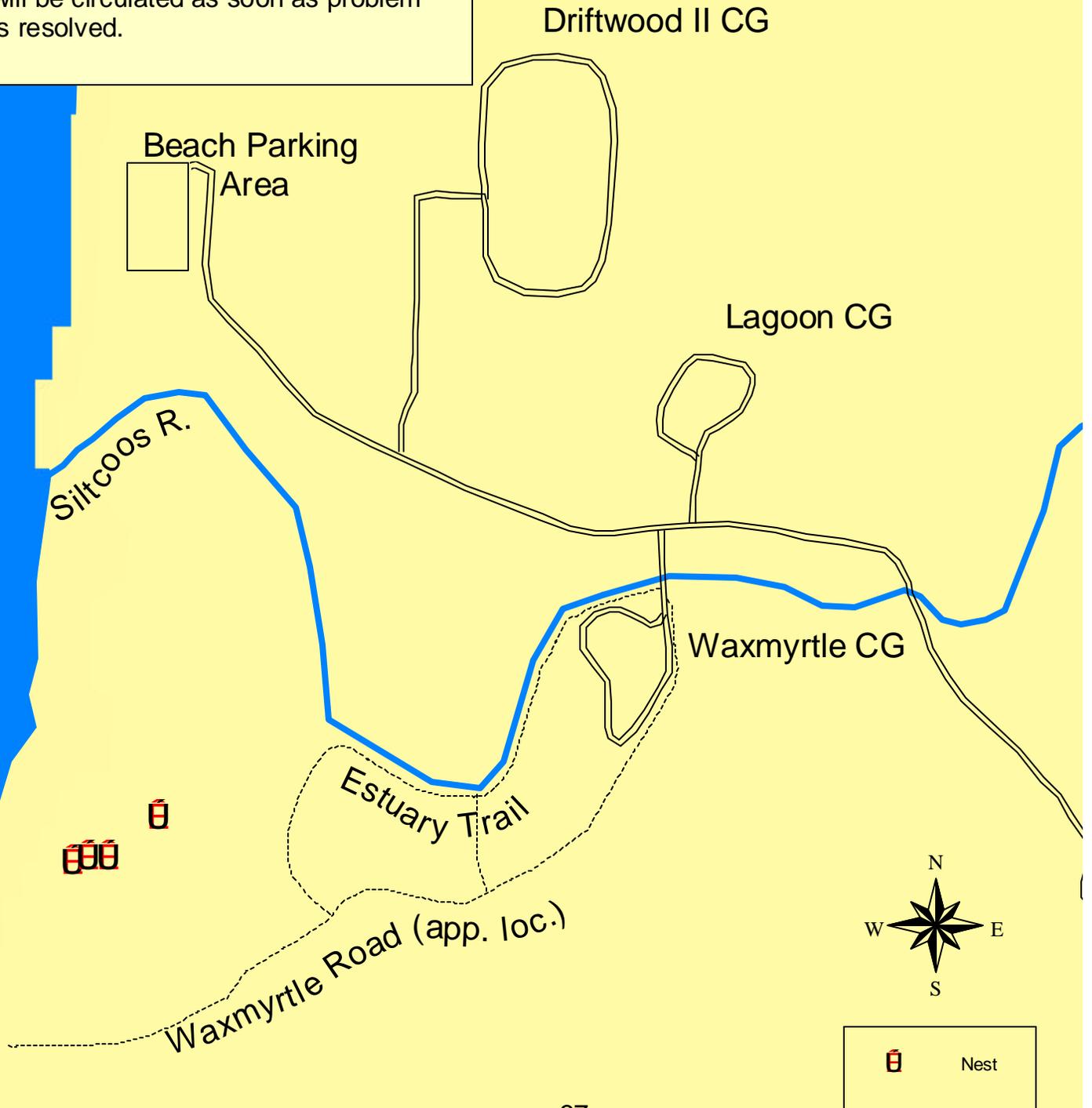
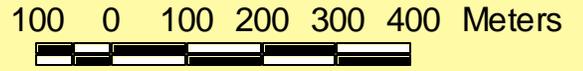


Figure 3. Snowy Plover nest locations at the Overlook Clearing, Oregon, 2004.

Due to difficulties with our GPS unit, all 11 nest points at the North Overlook HRA are missing from this map. Revised maps will be circulated as soon as problem is resolved.



Figure 4. Snowy Plover nest locations at Tahkenitch Creek, Oregon, 2004.

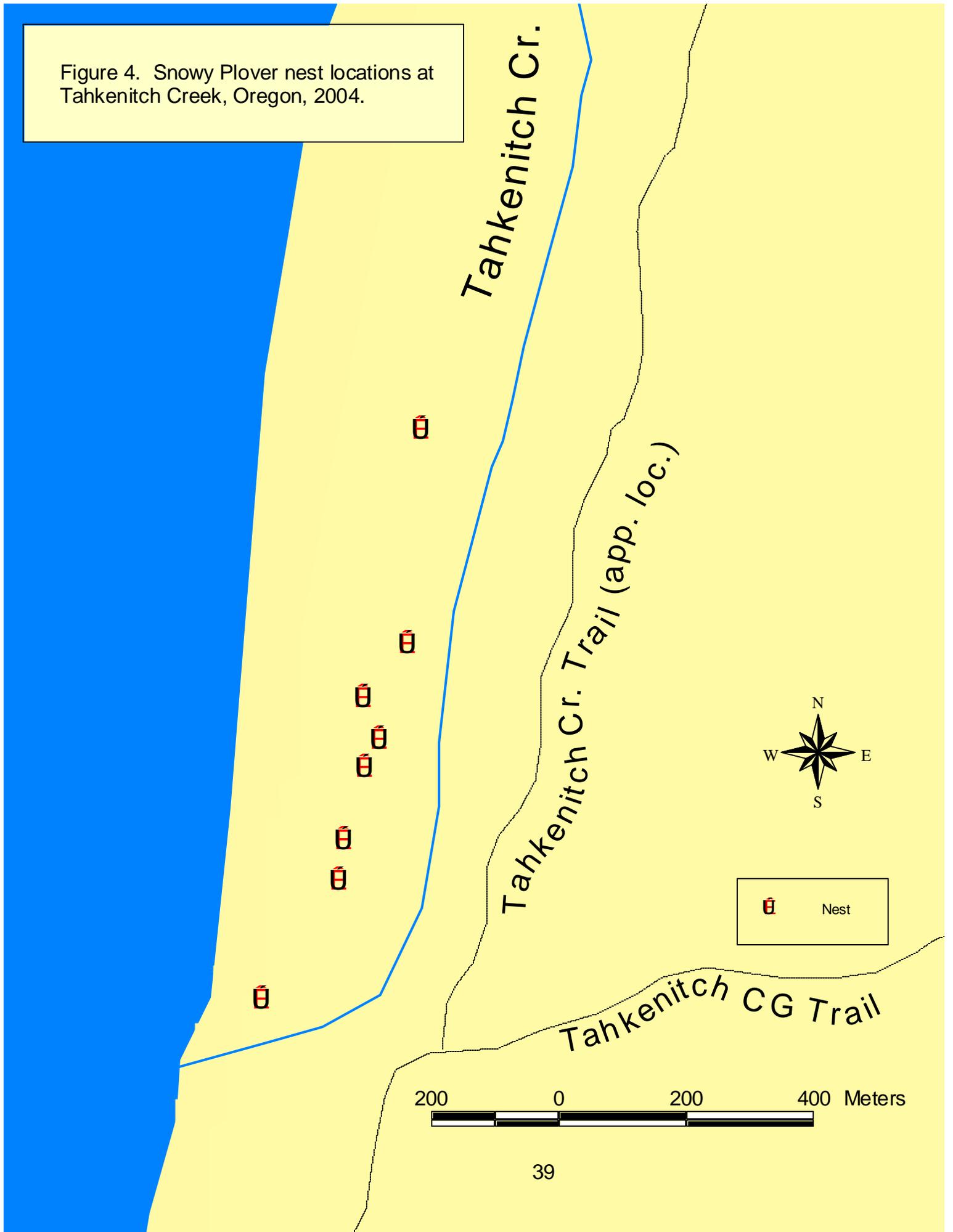


Figure 5. Snowy Plover nest locations at Tenmile Creek, Oregon, 2004.

Due to difficulties with our GPS unit, 2 nest points at North Tenmile are missing from this map. Revised maps will be circulated as soon as problem is resolved.



Figure 6. Snowy Plover nest locations at Coos Bay North Spit, Oregon, 2004.

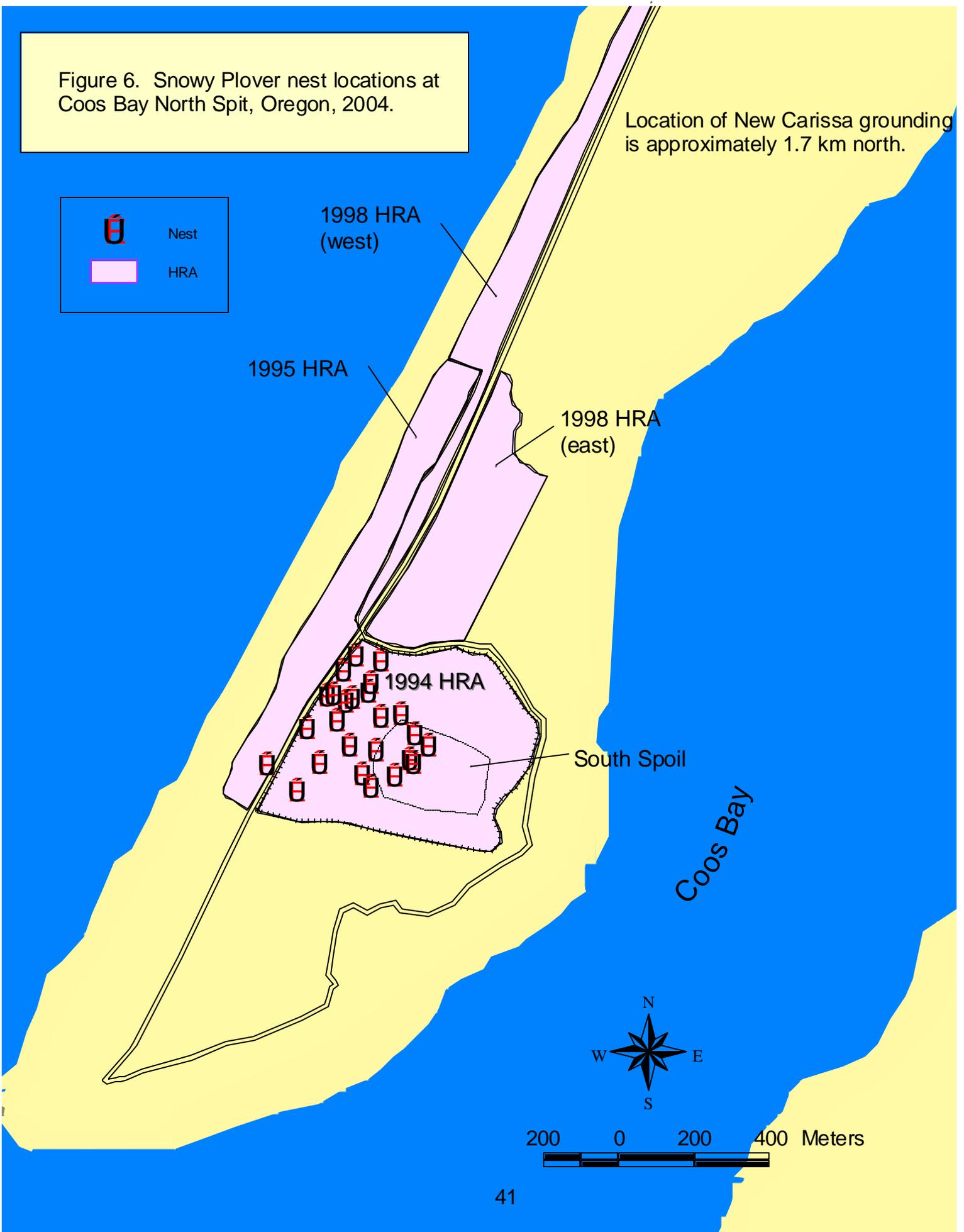


Figure 7. Snowy Plover nest locations at Bandon Beach, Oregon, 2004.

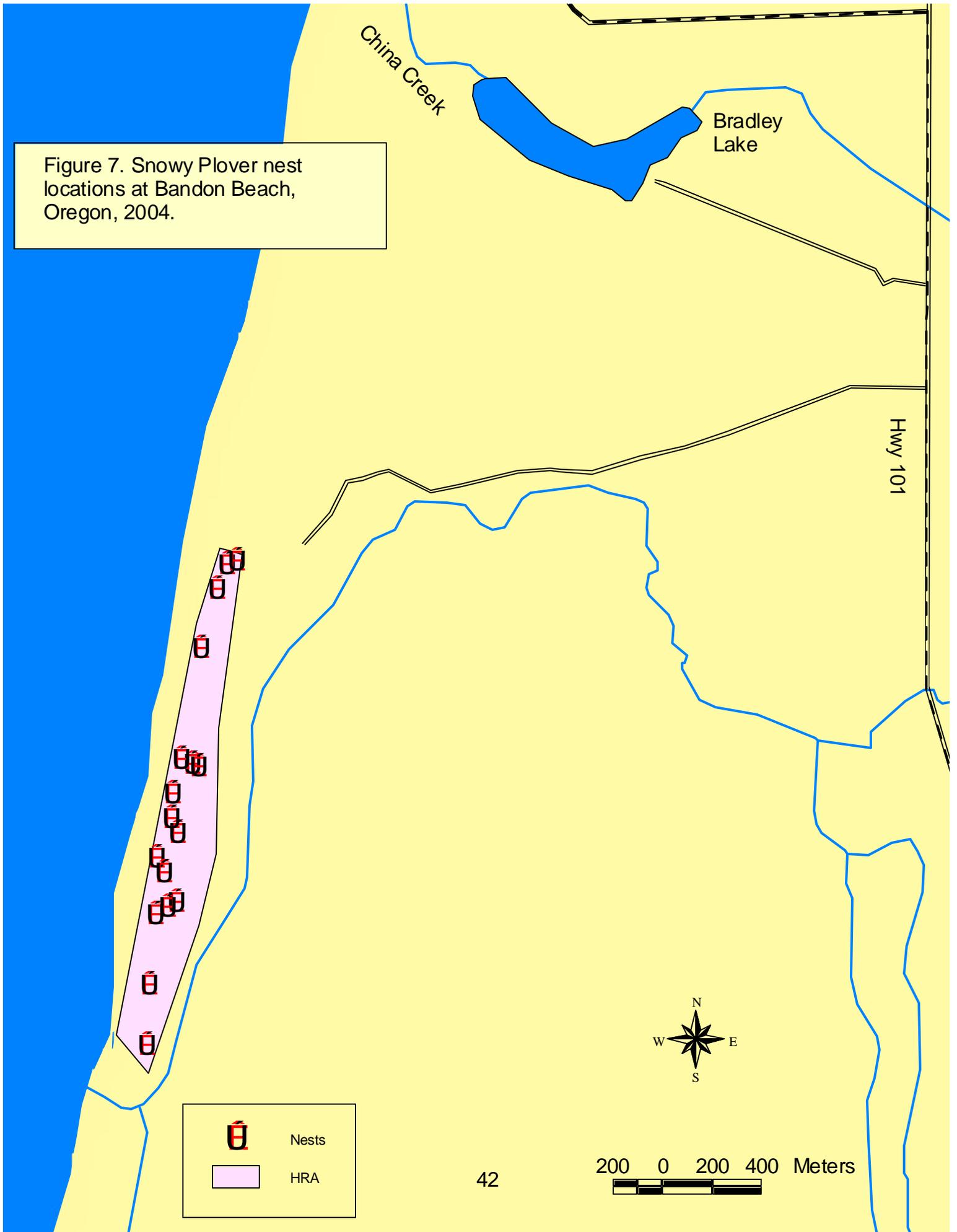
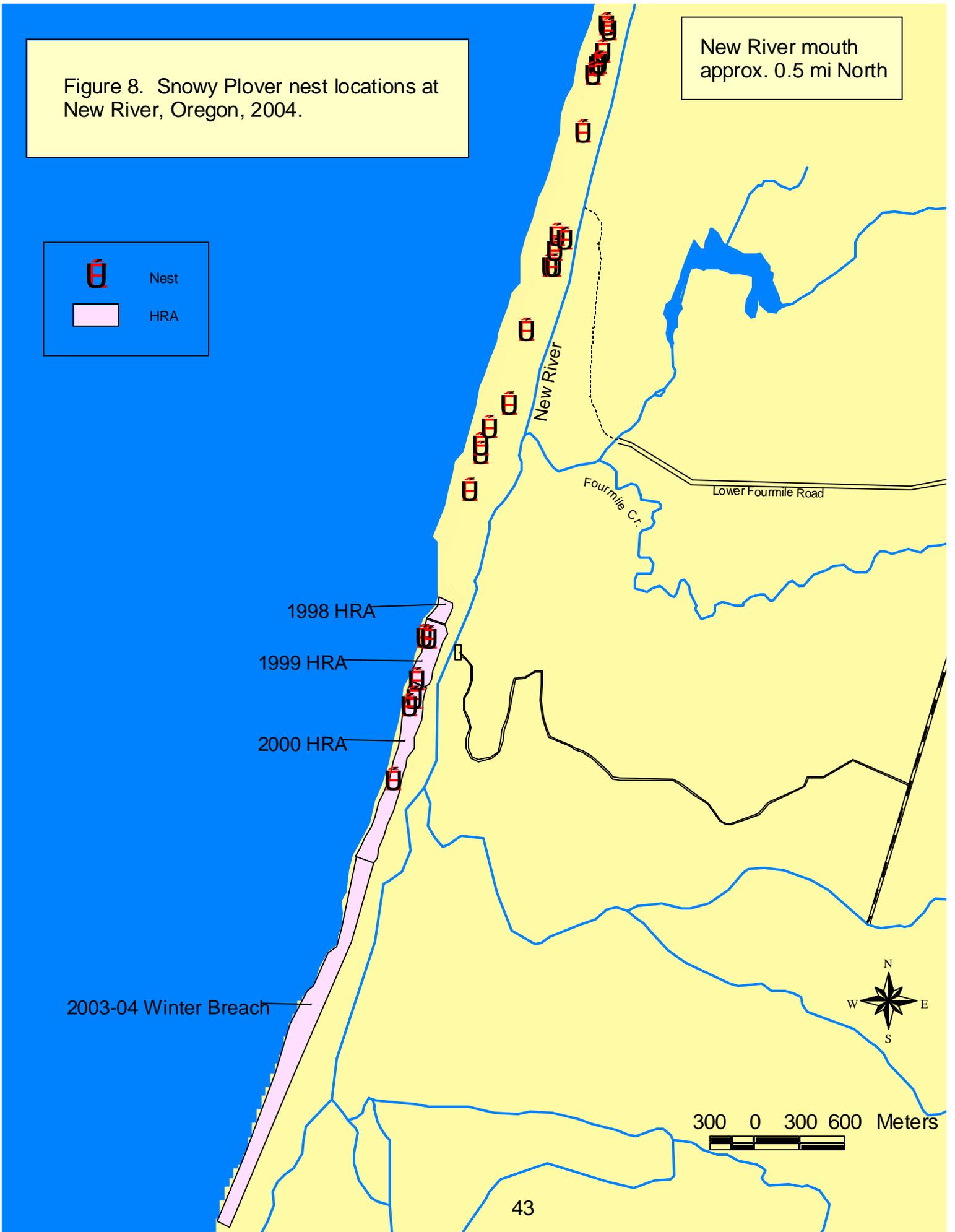


Figure 8. Snowy Plover nest locations at New River, Oregon, 2004.

New River mouth
approx. 0.5 mi North

 Nest

 HRA



300 0 300 600 Meters

Figure 9. Number of active Snowy Plover nests within 10 day intervals on the Oregon coast, 2004. Dashed lines represent +/- 2 standard deviations

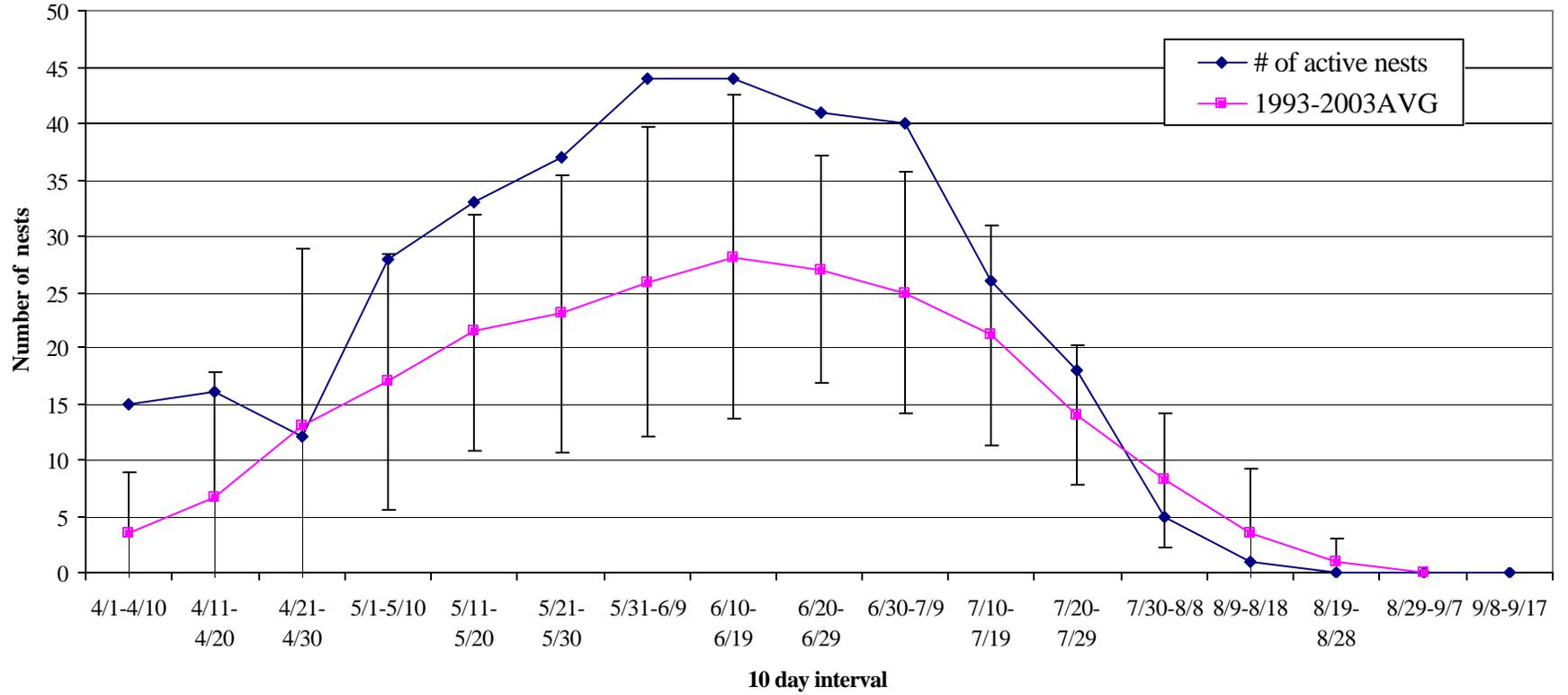


Figure 10. Total percent nest success for Snowy Plovers along the Oregon coast, 1990-2004. Above each bar is the total number of nests that hatched over the total number of nests.

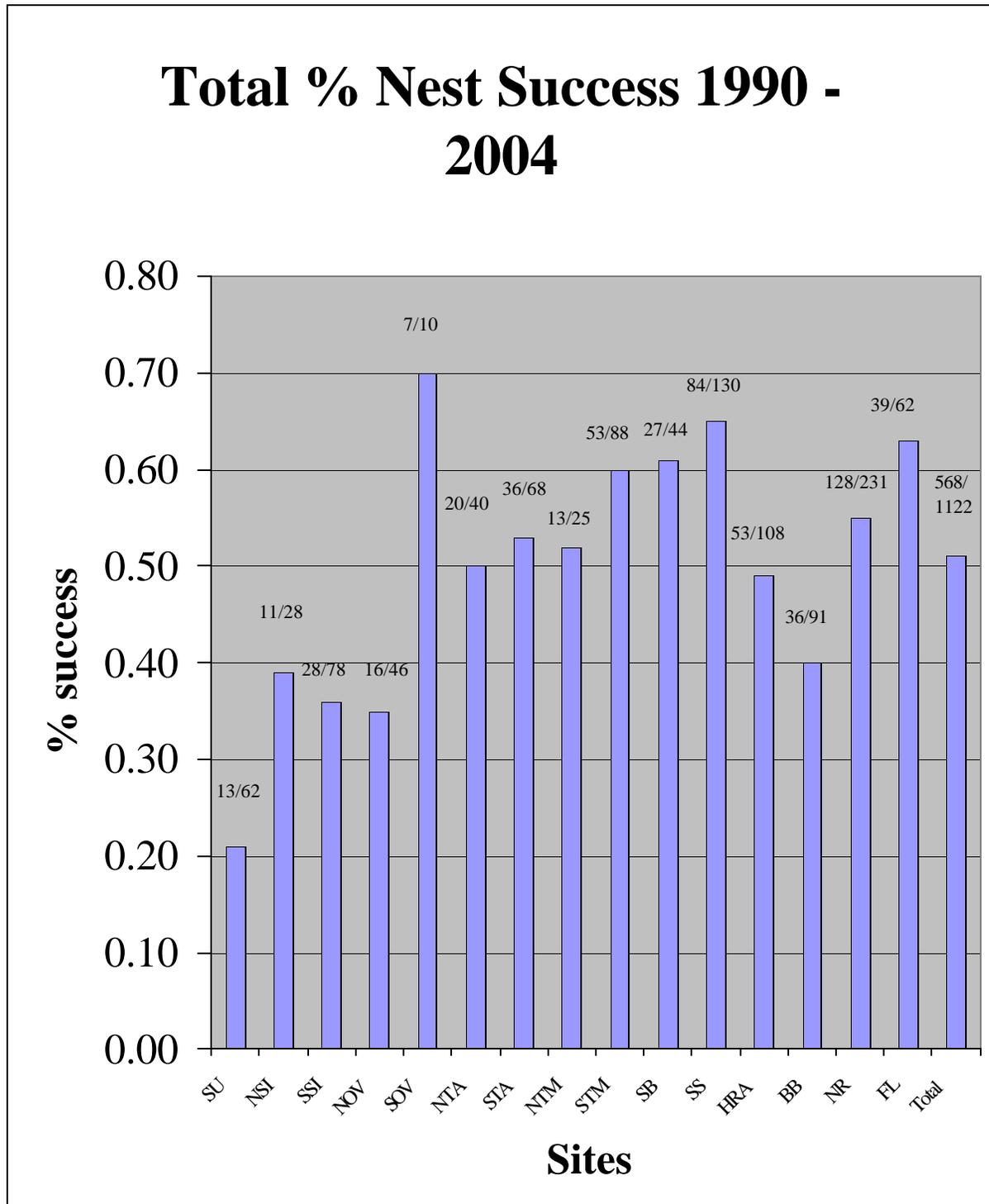
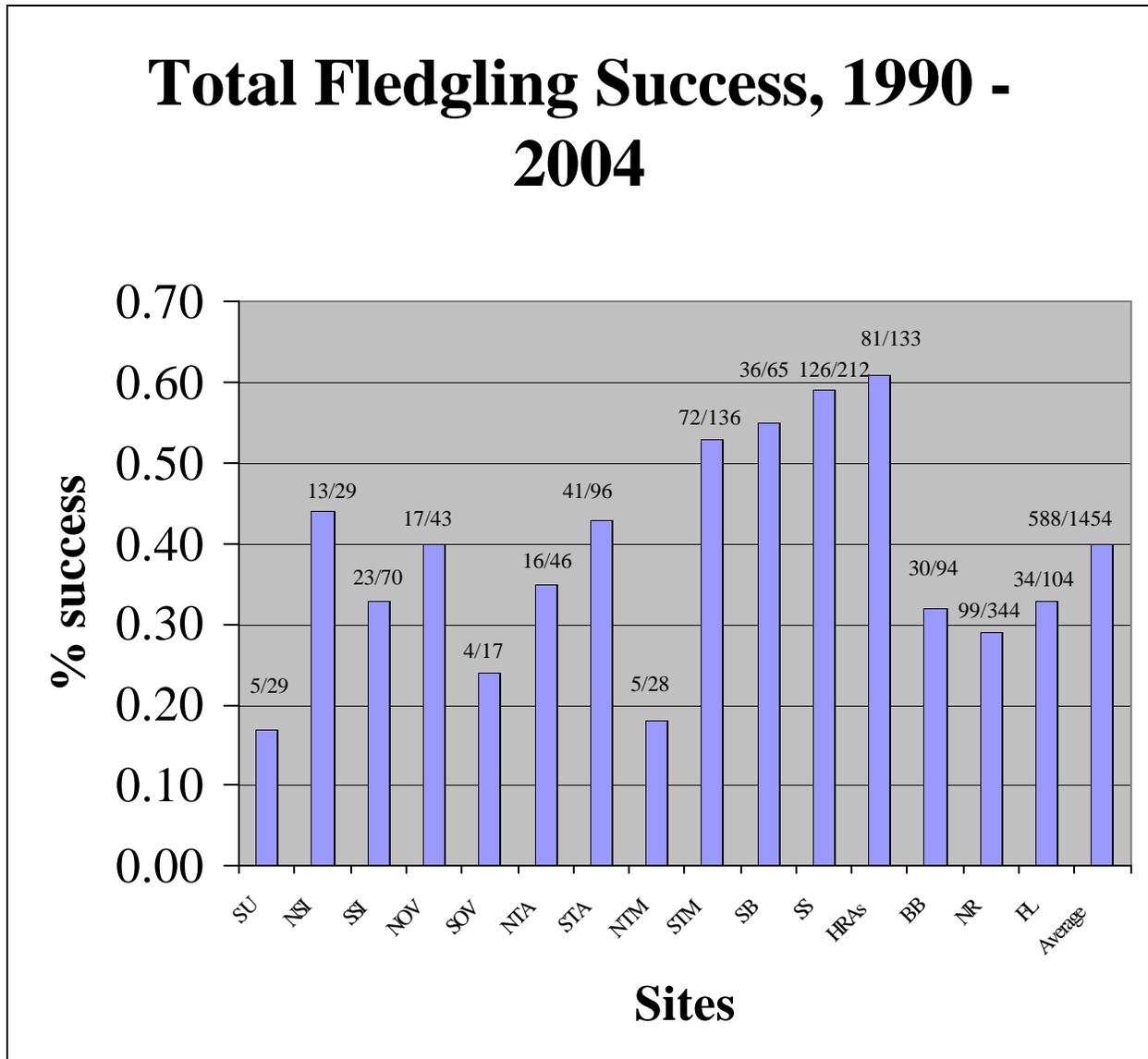


Figure 11. Percent fledgling success of Snowy Plovers at each nesting site along the Oregon coast, 1990-2004. Above each bar is the number of fledglings over the number of hatched eggs.



APPENDIX A. Study Area

The study area encompassed known nesting areas along the Oregon coast including all sites between Berry Creek, Lane Co., and Floras Lake, Curry Co. (Fig. 1). Survey effort was concentrated at the following sites, listed from north to south:

Sutton Beach, Lane Co.: the beach north of Berry Creek south to the mouth of Sutton Creek.

North Siuslaw, Lane Co.: the beach north of the north jetty of the Siuslaw River north to the mouth of Sutton Creek.

Siltcoos: North Siltcoos, Lane Co. - the north spit, beach, and open sand areas between Siltcoos River mouth and the parking lot entrance at the end of the paved road on the north side of the Siltcoos River; and South Siltcoos, Lane Co. - the south spit, beach, and open sand areas between Siltcoos River mouth and the Waxmyrtle trail beach entrance.

Dunes Overlook Clearing, Douglas Co.: the area cleared of beachgrass, beginning in 1998, directly west of the Oregon Dunes Overlook off of Hwy 101.

Tahkenitch Creek to the Umpqua River, Douglas Co.: Tahkenitch North Spit - the spit and beach on the north side of Tahkenitch Creek; Tahkenitch South Spit - the spit and beach between Tahkenitch Creek and the south end of the vehicle closure; North of Threemile Creek. - the beach from the south end of the vehicle closure to Threemile Creek; and South of Threemile Creek. - the beach between Threemile Creek and the Umpqua River.

Tenmile: North Tenmile, Coos and Douglas Cos. - the spit and ocean beach north of Tenmile Creek, north to the Umpqua River jetty; and South Tenmile, Coos Co. - the south spit, beach, and estuary areas within the Tenmile Estuary vehicle closure, and continuing south of the closure for approximately 1/2 mile.

Coos Bay North Spit (CBNS), Coos Co: South Beach - the beach between the north jetty and the F.A.A. towers; South Spoil/HRA - the south dredge spoil and adjacent habitat restoration areas (HRA); and Bayside - the bay south of the South Spoil.

Bandon Beach, Coos Co: the beach between China Creek and New River mouth, including the large habitat restoration area north of the mouth of Twomile Creek.

New River Spit, Coos and Curry Cos.: the beach and sand spit on the south side of the mouth of New River, and the oceanside beach, overwashes and riverside deltas between the open spit and south to BLM lands, and the habitat restoration area (HRA) adjacent to the BLM boat launch at the Storm Ranch ACEC.

Floras Lake/New River Overwash, Curry Co.: the beach west of Floras Lake north including the two overwash areas near the confluence of Floras Creek and Floras Lake outflow.

The following additional areas were surveyed in early spring to determine whether potential prospecting plovers were present and some were checked for the summer window survey: Necanicum Spit, Bayocean Spit, Sand Lake Spit, Nestucca River Spit, South Beach Newport, Whiskey Creek to Coquille River, Blacklock Point to Sixes River, Elk River Spit, Euchre River Spit, and Pistol River Spit.

APPENDIX B. Recommendations for Management of Recreational Activities and Habitat Restoration for sites with Snowy Plovers along the Oregon Coast - 2003.

Necanicum:

- ? Continue to monitor this site early in the nesting season to determine plovers presence and potential nesting activity.

Sutton:

- ? Continue to expand, improve and manage a nesting area behind the foredune; consider spreading shell hash or woody debris to improve the nesting substrate.
- ? Implement predator management if plovers are nesting to reduce predation pressure on broods, particularly corvids.
- ? Continue roping and signing of dry sand from Sutton Creek to north of Berry Creek.
- ? Continue to sign the backside of the foredune in order to minimize pedestrian crossing of dry sand.
- ? Place signs on the south side of Sutton Creek notifying people that if they cross the creek dogs must be on leash at all times.

Siltcoos North and South Spits:

- ? Continue predator management to reduce the number of corvids using the nesting area.
- ? Continue to close the Estuary Trail, which benefits nesting Snowy Plovers. Continue signage along river, especially east of nesting area and on any “islands” that may develop to alert kayak/canoe users about plover management activities.
- ? Continue to post the area with updated maps of the estuary and beach at several locations. These areas include the Stagecoach Trailhead, the north parking lot, and both ends of the Waxmyrtle Trail.
- ? Erect ropes and signs prior to 15 March, to be as effective as possible. Place signs and ropes on east and south side of the north spit nesting area as well as continued signage to the west and north.
- ? Continue to prohibit dogs on the spits and near the estuary during nesting season.
- ? Continue the use of campground plover hosts/volunteers to educate people and keep them out of closed areas. Use hosts/volunteers, especially during peak periods on weekends, and stagger their hours to cover evenings. Have

hosts/volunteers in contact with Law Enforcement Officers to improve enforcement of the closures, and have them engage people on the beach before violations occur.

- ? Continue to extend appropriate signing to both riverbanks, to prevent hikers from walking up the closed estuary.

Overlook:

- ? Continue predator management to control corvid use of the area.
- ? Continue to rope and sign both north and south closures for Snowy Plover nesting habitat by 15 March, which is the onset of the nesting season.
- ? Continue to improve and enlarge the restoration area, especially to the south towards Tahkenitch. Remove European beachgrass along the southeastern edge of the north clearing. Minimize disturbance along the north edge of nesting area where dense mats of pink sand verbena are flourishing. Restoration work should be scheduled after the Snowy Plover nesting season is completed, acknowledging in advance that broods may remain in the area as late as mid-September.
- ? Additional interpretive signing is recommended at the beginning of the Overlook trailhead(near viewing platforms). This signing is intended to provide more information on the ecology of the Snowy Plover and the reasoning for current management techniques and restricted areas.
- ? Continue to restrict all dogs to leashes adjacent to the Overlook nesting areas. It should be noted that many hikers with dogs are compliant while on-trail but often unleash their animals upon reaching the beach, therefore additional signing for clarification is highly recommended.

Tahkenitch:

- ? Continue to maintain and improve the habitat.
- ? Continue predator management to control corvid use of the area.
- ? Continue to rope and sign all suitable habitat. Place signs along east and south edge outside of the roped area to prevent hiking and camping near nesting area.
- ? Continue to restrict dogs to leashes adjacent to closure areas.

Tenmile North and South Spits:

- ? Continue predator management to control corvid use of the area.
- ? Continue to maintain and improve the south side for nesting. Consider removal of foredune on the north side to expand nesting area northward. Block old road that leads to northeast edge of nesting area. Several ATVs approached nesting area using this old pathway.
- ? Continue to rope and sign plover nesting habitat on both north and south spits.
- ? Enforce vehicle closure to prevent violators from driving in the habitat restoration areas.

Coos Bay North Spit:

- ? Continue predator management of the area for corvids. Evaluate elk use of the area and attempt to control elk access of the nesting areas.

- ? Continue to improve and maintain the habitat restoration areas. Continue to spread shell hash to improve nesting substrate. Continue to maintain the fence, and remove accumulated sand and grass.
- ? Reopen the gaps in the berm along the 95HRA to facilitate brood movement from the 94HRA to the 95HRA and to the beach. Create small vegetation free gaps in the foredune to facilitate brood access to the beach without destabilizing the foredune.
- ? Continue to rope and sign the beach as early in the nesting season as possible.
- ? Clearly sign all entrance points on the spit that the beach is street legal vehicles only, and inform all law enforcement agencies of the regulations on the beach.
- ? Permanently reroute the foredune road around the 94HRA and 98 HRA's to reduce disturbance to the plovers, especially during the nesting season. The seasonal reroute of the road continues to benefit plovers by reducing recreational activity, and thus disturbance, near the nesting area, and permits brood movements between the HRA's without any chance of harm from vehicle use.

Bandon:

- ? Continue predator management to control fox and corvid populations.
- ? Continue to improve and maintain the habitat restoration area north of Twomile Creek.
- ? Sign and rope the habitat management area near to the mouth of Twomile Creek/New River before the nesting season.
- ? State Parks should continue to work with the administration of the Christian Camp to help explain the wet and dry sand restrictions to the public.
- ? All law enforcement agencies should again be informed as to the status of the vehicle regulations on the beach.
- ? Maintain enforcement of restricted areas and leash laws for dogs. Monitor hiker use from Bandon to Blacklock Point, and check the HRA on weekends for illegal camping activity.

New River:

- ? Continue predator management to control fox and corvid populations.
- ? Continue to improve and maintain the habitat restoration area.
- ? Continue to place interpretive signs on the east side of the river on the county land at the end of Lower Fourmile Road to inform the public of plover activity.
- ? Sign and possibly rope State Parks lands on the open spit south of the mouth of New River. Enforce dogs on leash rules. Consider use of an interpretive specialist to help monitor recreational activities in the area and explain the management efforts in the area.
- ? Work with the county to reduce the ATV riding in the area. Encourage continuing cooperation of county, state and federal law enforcement officers to monitor vehicle use of the area.
- ? Continue to close the gate at the Storm Ranch for 15 April- 15 September.

Floras Lake:

- ? Continue to implement an adaptive management approach between the BLM and Curry Co. Engage local private landowners to cooperate with plover management in the area north of the county land.
- ? Continue the seasonal restrictions and use of ropes and signs as determined by the cooperative management agreement.
- ? Enforce dogs on leash rules at all times.
- ? Continue to hire an on-site interpretive specialist, to contact the public, monitor the beach, and present slide shows.